



**Wednesday, February 19, 2025 @ 6:30 PM**

**HOW TO ATTEND**

- **In-person:** Council Chambers, Lakewood City Hall, 6000 Main St SW., Lakewood, WA 98499
- **Virtually:** Online or by phone.  
Online: <https://cityoflakewood-us.zoom.us/j/88030740190>  
Phone: (253) 215-8782 and enter meeting ID: 880 3074 0190
- **Livestream:** <https://YouTube.com/CityofLakewoodWA>

*Persons requesting special accommodation or language interpreters should call 253-983-7767 as soon as possible in advance of the meeting so that an attempt to provide special accommodation can be made.*

**PUBLIC COMMENT**

Public comments or testimony on public hearings are accepted by mail, email, or by in-person or virtual attendance. Mail comments to Karen Devereaux, Planning Commission Clerk, 6000 Main Street SW Lakewood, WA, 98499 or email [kdevereaux@cityoflakewood.us](mailto:kdevereaux@cityoflakewood.us). Comments received by noon the day of the meeting will be provided to the commission electronically.

**IN-PERSON/VIRTUAL COMMENTS**

Each person has 3 minutes. Attendees are allowed to speak during public comment or public hearings only. Those attending in person will be called on by the Chair. Those attending via Zoom should use the “raise hand” function to indicate they wish to speak. Once the Chair calls your name, you will be unmuted. First, state your name and city of residence, and then provide your testimony.

**WELCOME/CALL TO ORDER**

**ROLL CALL**

**APPROVAL OF MEETING MINUTES** dated February 5, 2025

**AGENDA UPDATES**

**PUBLIC COMMENT**

**PUBLIC HEARINGS**

- Multifamily Tax Exemption (MFTE) Program Updates and Residential Target Area (RTA) Boundary Review Changes

**UNFINISHED BUSINESS**

**NEW BUSINESS**

- 2025 Middle Housing Regulation Updates (Ben Han, BERK)
- 2024 Urban Forestry Assessment Report (Kim Frappier and Sam Payne, Facet NW)

**NEXT STEPS**

- REPORTS FROM CITY COUNCIL LIAISON, CITY STAFF, PLANNING COMMISSION MEMBERS
- NEXT MEETINGS: MARCH 5, MARCH 19, APRIL 2, AND APRIL 16

**Attachments**

- Staff Report: Multifamily Tax Exemption (MFTE) Residential Target Area (RTA) Boundary Review
- Staff Report: Middle Housing Regulations
- Staff Report: 2024 Urban Forestry Assessment Report



**Lakewood Planning Commission  
February 5, 2025 Meeting Minutes**

**WELCOME/CALL TO ORDER**

Phillip Combs, Chair, called the meeting to order at 6:30 p.m.

**ROLL CALL**

**Planning Commission Members Present** Phillip Combs, Chair; Ellen Talbo, Vice Chair; Mark Herr, Sharon Wallace, Philip Lindholm, and Robert Estrada

**Planning Commission Members Absent** Linn Larsen

**Staff** Jeff Rimack, Director, PPW; Tiffany Speir, Planning Division Manager, PPW; Becky Newton, Economic Development Manager, PPW; and Karen Devereaux, Administrative Assistant, PPW

**Council Liaison** Councilmember Paul Bocchi (present)

**APPROVAL OF MINUTES**

**MOTION:** To approval of January 15, 2025, meeting minutes with corrections as identified by Planning Commissioners.

**SECONDED. PASSED 6-0.**

**AGENDA UPDATES** The NECC program update was removed from the agenda.

**PUBLIC COMMENT** None

**PUBLIC HEARINGS** None

**UNFINISHED BUSINESS**

Continued Discussion of Draft Updates to Multifamily Tax Exemption (MFTE) Program Regulations and Residential Target Area (RTA) Boundary Changes. Ms. Becky Newton provided additional information to the Planning Commission regarding the draft updates to the MFTE program regulations and the staff-recommended Central Business District (CBD) RTA boundary expansion. The Commission discussed the proposed changes in preparation for the public hearing to be held February 19.

**NEW BUSINESS** None

**REPORTS**

**Council Liaison Comments**

Councilmember Paul Bocchi provided an update to the Commission regarding the addition of two amendments to the 2025 Comprehensive Plan docket list.

**City Staff Comments**

Ms. Tiffany Speir shared the next regular meeting dates.

**ADJOURNMENT** Meeting adjourned at 8:00 p.m.

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Phillip Combs, Chair

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Karen Devereaux, Clerk



**TO:** Lakewood Planning Commission

**FROM:** Jeff Rimack, Director, Planning and Public Works, and  
Becky Newton, Economic Development Manager

**DATE:** FEBRUARY 19, 2025

**SUBJECT:** PUBLIC HEARING: Multifamily Tax Exemption Program  
Residential Target Area Review and Code Amendments

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## Meeting Purpose

Hold a Public Hearing to review:

- Four potential locations for Residential Target Area (RTA) expansion.
- Two code amendments addressing Multi-Family Tax Exemption (MFTE) timelines and applications.

## Proposed Changes

### Code Amendments

Staff propose the following amendments to facilitate better participation from property owners and developers in the MFTE program. Participation in the MFTE program increases economic development and housing supply in designated areas of the city.

1. 3.64.020(G)-12-year extension added for CBD (City Council Recommendation)  
*“Extension for Projects Receiving an Initial Eight-Year or 12-Year Exemption. Any project in the **Central Business District outside of the Tax Increment Area**, Lakewood Station District and Springbrook Residential Target Areas receiving an eight- or 12-year extension may apply for a subsequent 12-year extension in exchange for continued or increased income restrictions on affordable units.”*
2. 3.64.020(H)-MFTE Application Procedure (Staff Recommendation)  
*“Application Procedure. A property owner who wishes to propose a project for a tax exemption shall complete the following procedures:*
  1. *File with the Department of Planning and Public Works (PPW) the required application along with the required fees as set in the Lakewood Master Fee Schedule (adopted annually by resolution). **The application shall be filed after land use permitting is complete or prior***

*to building permit issuance if no land use action is required. Conditional agreements shall be fully executed prior to issuance of building final certificate of occupancy. If the application shall result in a denial by the City, the City will retain that portion of the fee attributable to its own administrative costs and refund the balance to the applicant”*

## RTA Expansion

At the direction of the City Council, department staff reviewed existing zones for potential expansion of RTA locations. The intention was to review which locations were best suited to incentivize economic growth and increase housing stock in the city of Lakewood, while maintaining the character and culture the city is known for.

Having reviewed Springbrook, Lakewood Station, Oakbrook, and the Central Business District (CBD) areas, staff recommend the expansion of the RTA in the Central Business District.

This recommendation is made for the following reasons:

### **City Design/Planning Intentions**

- The Comprehensive Plan and subarea plans plan for new growth expectations in population, housing units and jobs.
- The CBD is the area designated in the Comprehensive Plan and Downtown Subarea Plan for a significant share of new housing development and job growth in the city.
- Underutilized in terms of density and location, that Growth Management Act (GMA) would focus development.
- Existing zoning classifications and land use designations support this.
- Maintains continuity of RTAs themselves
  - Aligns borders of the CBD RTA and the CBD itself.
  - Prevents island RTAs in other areas of the city.
- Increased housing is required to maintain the CBDs Regional Growth Center (RGC) designation.
  - RGC designation is necessary to qualify for transportation grants that help finance past, present, and future Capital Road improvement projects throughout the city.
- The 2018 Environmental Impact Study (EIS) and 2024 Supplemental EIS for the 2024 Comprehensive Plan periodic update focused on increased housing density within the CBD and providing proposed mitigation measures for adverse impacts.
- The Downtown subarea plan update
  - Adjusted zoning map and increased development density
  - Clear design standards and simple design review
  - Simplified parking standards
  - A subarea-wide SEPA planned action ordinance to eliminate the need for specific projects to conduct individual SEPA review
  - It has the highest density allowances in the city

- Existing infrastructure capacity
- Frontage improvements are required that allow for multi-modal transportation.
- Traffic mitigation is a focus in the CBD
  - Transportation capital improvements have been implemented to facilitate traffic flows in the CBD
  - The Green Street Loop and Non-motorized plans for pedestrian access are centered in the CBD
  - The city's public transportation transfer facility is located in the CBD
  - The recently awarded Raise Grant is to investigate and provide design improvements for Multi-modal transportation in the CBD

### **Neighborhood protections**

- Design requirements that provide control over the character of any project located within it.
- LMC 18B.200.250 requires a transition area to provide a buffer between higher intensity uses in the Downtown District and lower intensity uses in the residential zones that surround downtown. To address potential impacts to surrounding residences transition areas have restrictions regarding:
  - Building Height
  - Building Setbacks
  - Parking and Loading
  - Refuse Containers
  - Mechanical Equipment

The neighborhood protections listed above are only applicable to the subareas and another reason why the CBD is the staffs recommendation.

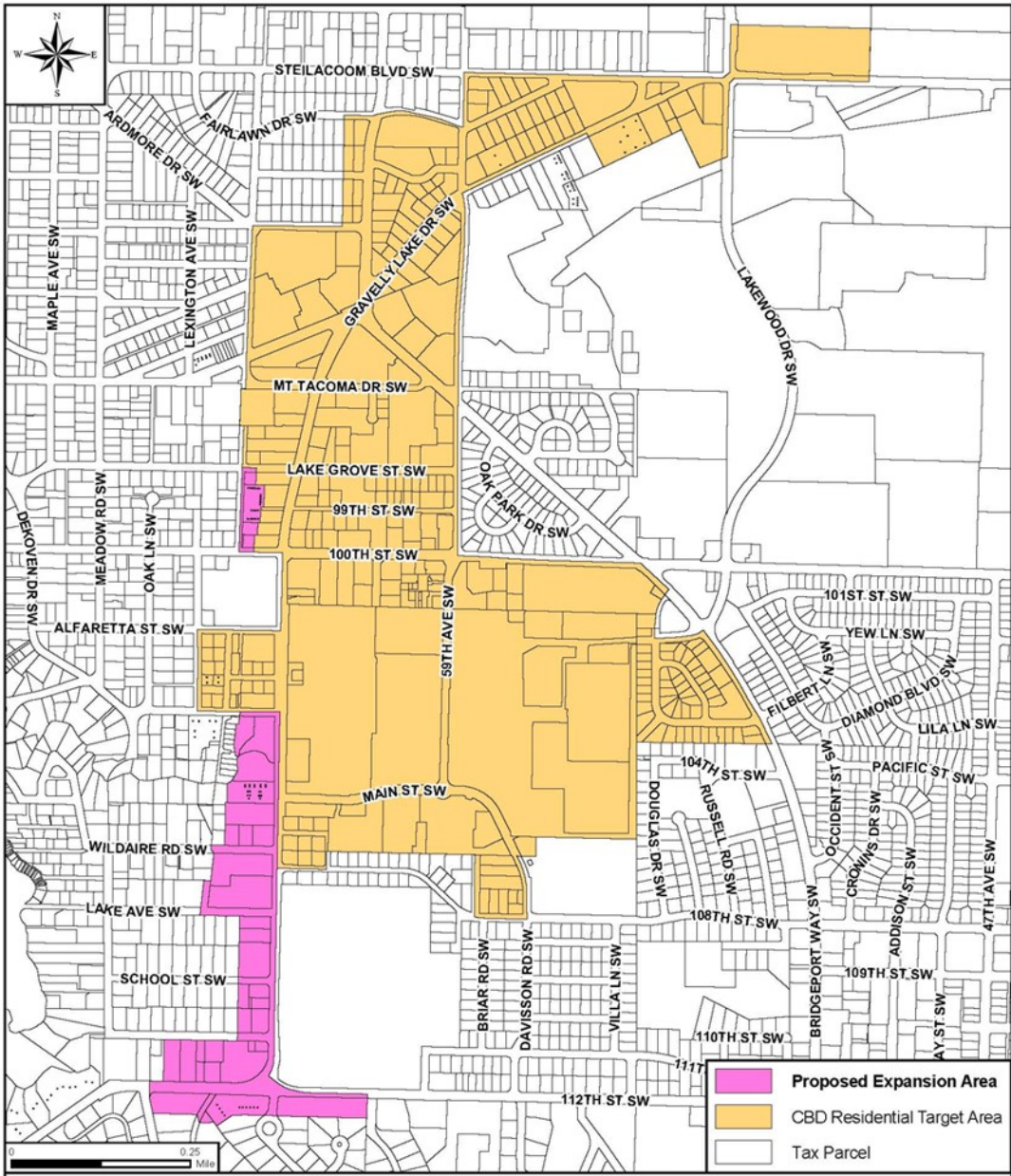
Selection of a different location for an RTA will result in conflicts and inconsistency with state laws, in the city's Comprehensive plan and associated subarea plans.



0 0.1 0.2 Miles

- Tax Lots
  - ▭ Recommended TIA
- Project Types**
- New Downtown Subarea Projects
  - Remodel Projects

6 of 118

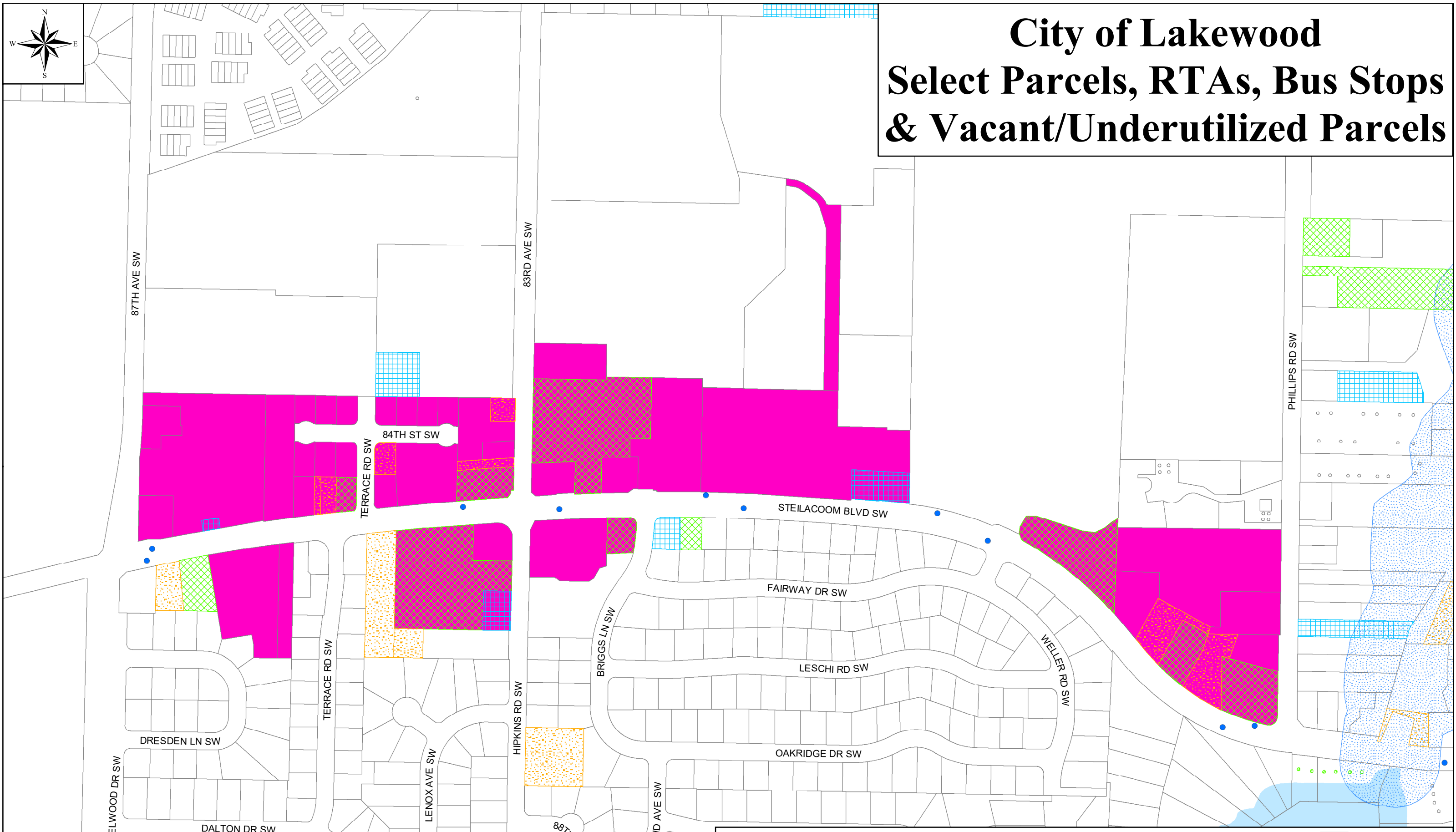


# Central Business District

## Residential Target Area (RTA) Proposed Expansion



# City of Lakewood Select Parcels, RTAs, Bus Stops & Vacant/Underutilized Parcels



Map Date: February 11, 2025

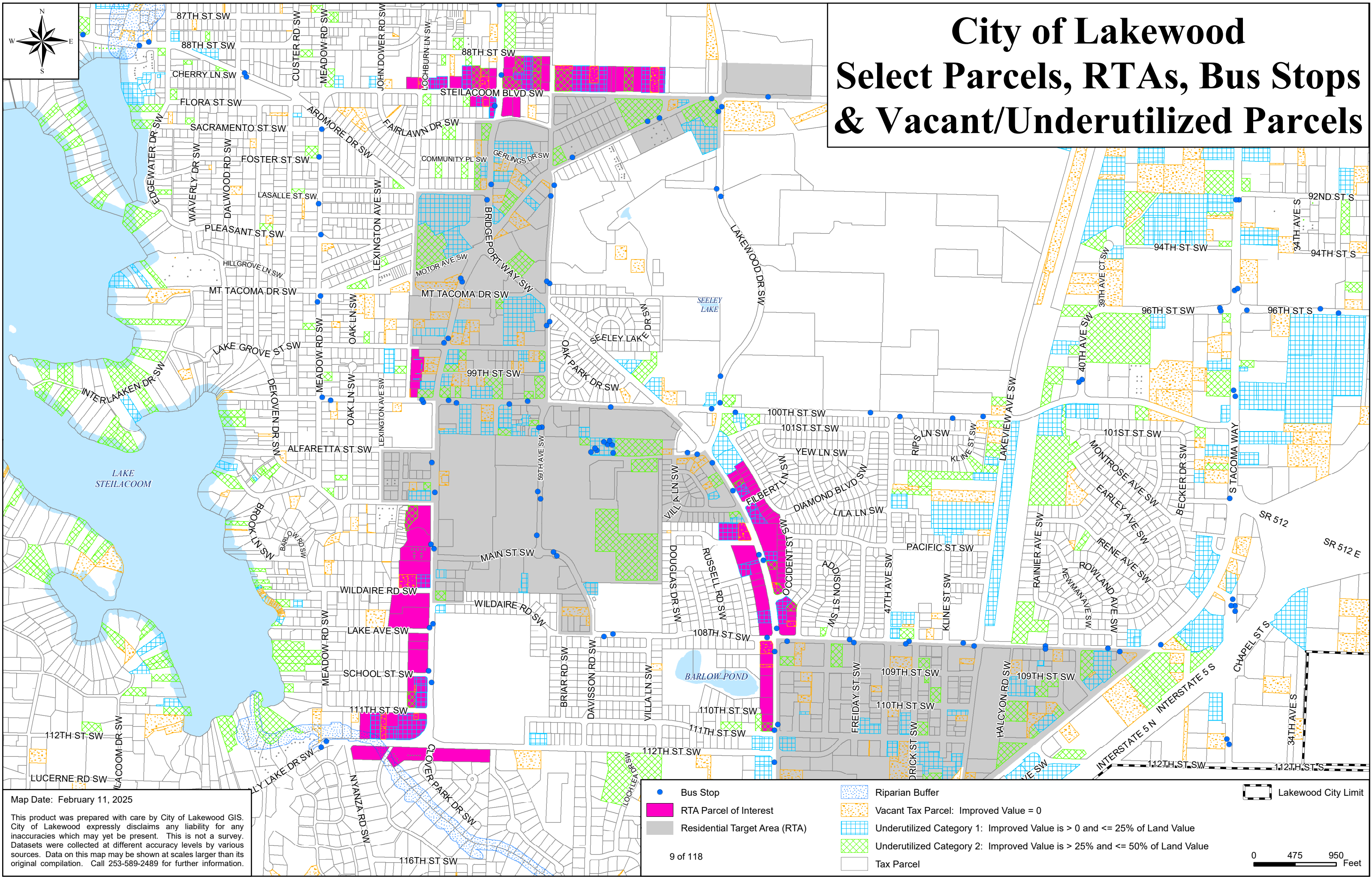
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Bus Stop	Riparian Buffer	Lakewood City Limit
RTA Parcel of Interest	Vacant Tax Parcel: Improved Value = 0	0 200 400 Feet
	Underutilized Category 1: Improved Value is > 0 and <= 25% of Land Value	
	Underutilized Category 2: Improved Value is > 25% and <= 50% of Land Value	
	Tax Parcel	



# City of Lakewood

## Select Parcels, RTAs, Bus Stops & Vacant/Underutilized Parcels



Map Date: February 11, 2025

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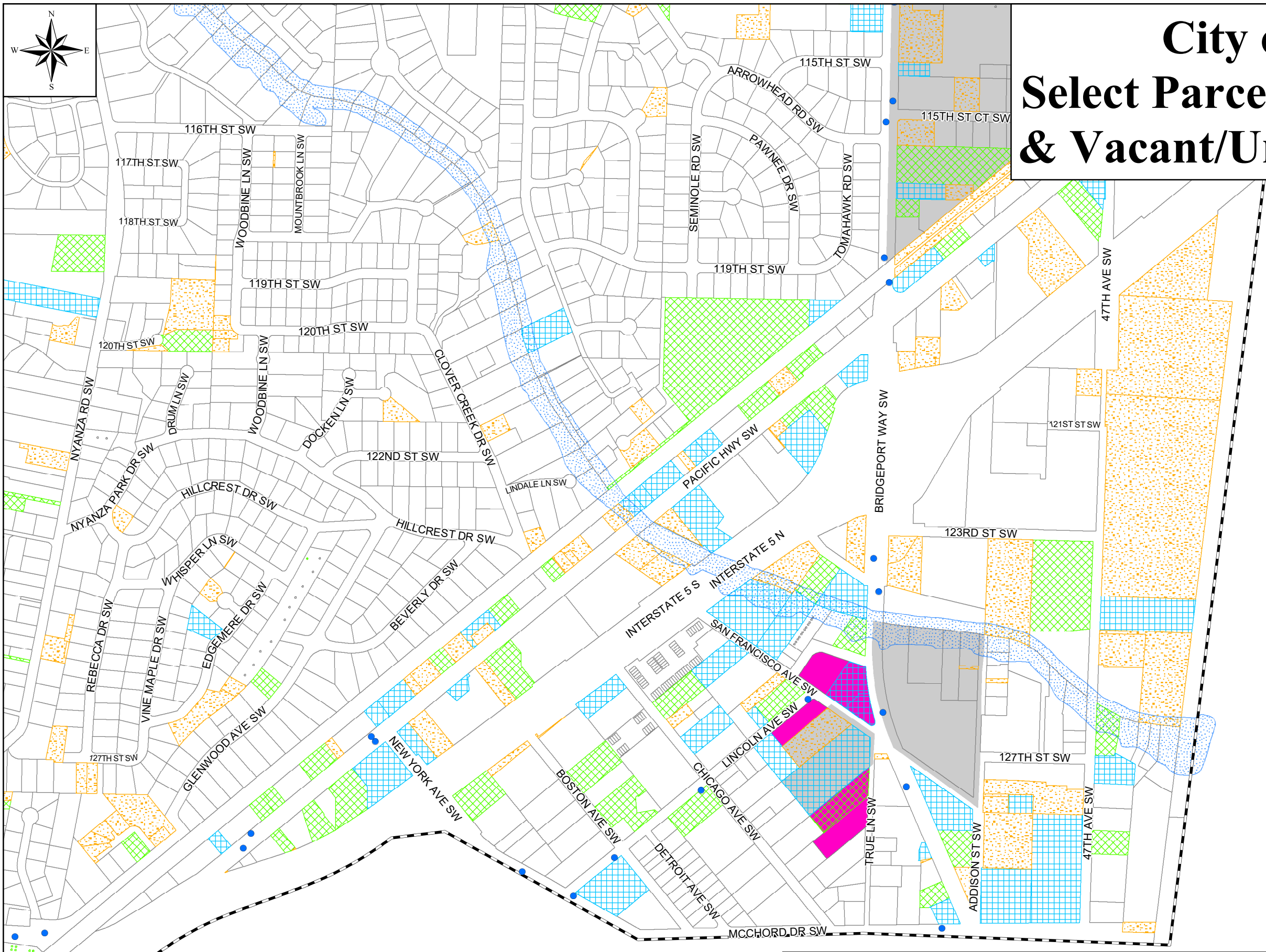
● Bus Stop	▨ Riparian Buffer
▨ RTA Parcel of Interest	▨ Vacant Tax Parcel: Improved Value = 0
▨ Residential Target Area (RTA)	▨ Underutilized Category 1: Improved Value is > 0 and <= 25% of Land Value
9 of 118	▨ Underutilized Category 2: Improved Value is > 25% and <= 50% of Land Value
	▨ Tax Parcel

Lakewood City Limit

0      475      950  
 Feet

# City of Lakewood

## Select Parcels, RTAs, Bus Stops & Vacant/Underutilized Parcels



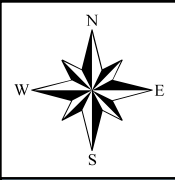
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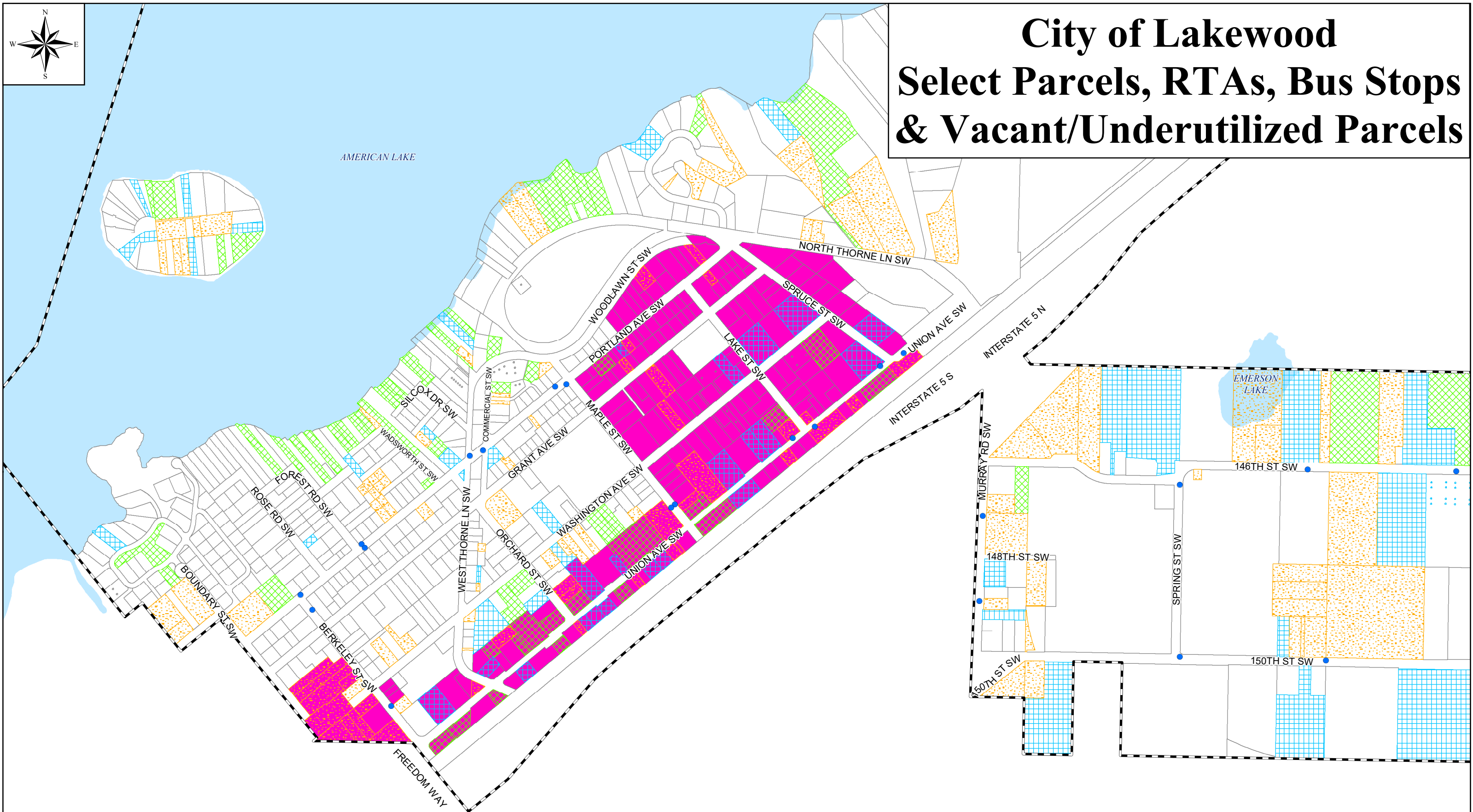
Bus Stop	Riparian Buffer
RTA Parcel of Interest	Vacant Tax Parcel: Improved Value = 0
Residential Target Area (RTA)	Underutilized Category 1: Improved Value is > 0 and <= 25% of Land Value
10 of 118	Underutilized Category 2: Improved Value is > 25% and <= 50% of Land Value
	Tax Parcel

Lakewood City Limit







0 300 600 Feet




# City of Lakewood Select Parcels, RTAs, Bus Stops & Vacant/Underutilized Parcels



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-  Bus Stop
-  RTA Parcel of Interest
-  Vacant Tax Parcel: Improved Value = 0
-  Underutilized Category 1: Improved Value is > 0 and <= 25% of Land Value
-  Underutilized Category 2: Improved Value is > 25% and <= 50% of Land Value
-  Tax Parcel

 Lakewood City Limit

0 300 600 Feet

AN ORDINANCE OF THE CITY OF LAKWOOD, WASHINGTON,  
IMPLEMENTING THE REQUIREMENTS OF ENGROSSED  
SUBSTITUTE HOUSE BILL (E2SHB) 1110, ADDING NEW SECTIONS  
\_\_\_\_\_, AMENDING SECTIONS\_\_\_\_\_,  
PROVIDING FOR SEVERABILITY, AND ESTABLISHING AN  
EFFECTIVE DATE.

**WHEREAS**, in 2023 the Washington State legislature passed Engrossed Substitute House Bill (E2SHB) 1110 (chapter 332, Laws of 2023) related to middle housing; and

**WHEREAS**, in passing E2SHB 1110 (chapter 332, Laws of 2023) the State legislature found that Washington is facing an unprecedented housing crisis for its current population and a lack of housing choices, and is not likely to meet affordability goals for future populations; and

**WHEREAS**, the State legislature further found that in order to meet the goal of 1,000,000 new homes statewide by 2044, and enhanced quality of life and environmental protection, innovative housing policies will need to be adopted and that increasing housing options that are more affordable to various income levels is critical to achieving the state's housing goals, including those established by the legislature in Engrossed Second Substitute House Bill No. 1220 (chapter 254, Laws of 2021); and

**WHEREAS**, the State legislature further found:

There is continued need for the development of housing at all income levels, including middle housing that will provide a wider variety of housing options and configurations to allow Washingtonians to live near where they work;

Homes developed at higher densities are more affordable by design for Washington residents both in their construction and reduced household energy and transportation costs;

While creating more housing options, it is essential for cities to identify areas at higher risk of displacement and establish anti-displacement policies as required in Engrossed Second Substitute House Bill No. 1220 (chapter 254, Laws of 2021);

The state has made historic investments in subsidized affordable housing through the housing trust fund, yet even with these historic investments, the magnitude of the housing shortage requires both public and private investment;

and

In addition to addressing the housing shortage, allowing more housing options in areas already served by urban infrastructure will reduce the pressure to develop natural and working lands, support key strategies for climate change, food security, and Puget Sound recovery, and save taxpayers and ratepayers money.

**WHEREAS**, E2SHB 1110 (chapter 332, Laws of 2023) is primarily codified in the Revised Code of Washington (RCW) section 36.70A.635; and

**WHEREAS**, in 2024 the Washington State legislature passed Engrossed Substitute House Bill (ESHB) 2321 (chapter 152, Laws of 2024), which modified certain middle housing requirements in RCW 36.70A.635, as well as amended definitions in RCW 36.70A.030; and

**WHEREAS**, on \_\_\_\_\_, the city council passed Ordinance No. \_\_\_\_\_ incorporating middle housing policies into the Housing Element of the Comprehensive Plan as required by House Bill 1220 (chapter 254, Laws of 2021); and

**WHEREAS**, on \_\_\_\_\_, the city transmitted a copy of the proposed ordinance to the Washington State Department of Commerce in accordance with RCW 36.70A.106 at least 60 days in advance of adoption for the required 60-day State review period; and

**WHEREAS**, on \_\_\_\_\_, the city issued a State Environmental Policy Act (SEPA) Determination of Non-Significance (DNS) on the proposed ordinance, which is a non-project proposal; and

**WHEREAS**, during the course of developing the proposed ordinance, various means of public outreach were used including, but not limited to, public meetings, a middle housing webpage, presentations at various community groups, notification of public hearings; and

**WHEREAS**, the city/town planning commission held work sessions on \_\_\_\_\_ to study and review matters related to implementing RCW 36.70A.635; and

**WHEREAS**, on \_\_\_\_\_, the city Planning Commission held a duly noticed public hearing on the proposed ordinance, accepted testimony and made a recommendation to the \_\_\_\_\_city/town council; and

**WHEREAS**, on \_\_\_\_\_, the city council held a duly noticed public hearing to consider the planning commission recommendation and accept public testimony; and

**WHEREAS**, adoption of the ordinance will bring the city/town into compliance with RCW 36.70A.635 and will serve the general welfare of the public;

NOW THEREFORE BE IT ORDAINED BY THE CITY COUNCIL AS FOLLOWS

## Section 1- Purpose

The purpose of this middle housing ordinance (“ordinance”) is to:

- A. Implement Engrossed Second Substitute House Bill 1110 and Engrossed Substitute House Bill 2321, codified in RCW 36.70A.030, 36.70A.280, 36.70A.635, 36.70A.637, 36.70A.638, 43.21C.495, and 43.21C.450, 64.32, 64.34, and 64.38, and 64.90, by providing land use, development, design, and other standards for middle housing developed on all lots zoned predominantly for residential use.
- B. If necessary, supersede, preempt, and invalidate the city’s development regulations that conflict with this ordinance until such time the city takes all actions necessary to implement RCW 36.70A.635, if the city has not taken action necessary to implement RCW 36.70A.635 by the time frame required by RCW 36.70A.635(11). The model ordinance shall remain in effect until the city has taken all necessary actions to implement RCW 36.70A.635.

## Section 2 – General Provisions

- A. Nothing in this ordinance prohibits the city from permitting detached single-family residences.
- B. Nothing in this ordinance prohibits the city from requiring any development, including middle housing development, to provide affordable housing, either on-site or through an in-lieu payment, nor limit the city's ability to expand or modify the requirements of an existing affordable housing program enacted under RCW 36.70A.540.
- C. Nothing in this ordinance requires the issuance of a building permit if other federal, state, and local requirements for a building permit are not met.
- D. Nothing in this ordinance affects or modifies the responsibilities of the city to plan for or provide “urban governmental services” as defined in RCW 36.70A.030.
- E. The city shall not approve a building permit for middle housing without compliance with the adequate water supply requirements of RCW 19.27.097.
- F. The city shall not require through development regulations any standards for middle housing that are more restrictive than those required for detached single-family residences, but may apply any objective development regulations that are required for detached single-family residences, including, but not limited to, set-back, lot coverage, stormwater, clearing, and tree canopy and retention requirements.
- G. The same development permit and environmental review processes shall apply to middle housing that apply to detached single-family residences, unless otherwise required by state law including, but not limited to, shoreline regulations under chapter 90.58 RCW, building codes under chapter 19.27 RCW, energy codes under chapter 19.27A RCW, or electrical codes under chapter 19.28 RCW.
- H. Conflicts. In the event of a conflict between this ordinance and other development regulations applicable to middle housing, the standards of this ordinance control.

## Section 3 – Definitions

Commerce guidance includes required definitions for specific land use terms, as well as optional definitions. Section LMC 18A.10.180 provides definitions for these land use terms, which will be reviewed and amended as necessary to align with Commerce guidance. The following updates will be made to **Section LMC 18A.10.180** (new text is shown in underline; deleted text is shown in ~~strikethrough~~):

Term	LMC Definition	Amended Definition
<u>Cottage housing</u>	<del>---</del>	<u>“Cottage housing” means residential units on a lot with a common open space that either: (a) is owned in common; or (b) has units owned as condominium units with property owned in common and a minimum</u>

Term	LMC Definition	Amended Definition
		<u>of 20 percent of the lot size as open space. Examples may include, but are not limited to, bungalow courts, garden court homes, courtyard cottages, and ecovillages.</u>
<u>Courtyard Apartments</u>	---	<u>"Courtyard apartments" means attached dwelling units arranged on two or three sides of a yard or court. Courtyard apartments may include, but are not limited to, garden apartments, and patio apartments.</u>
<u>Duplex</u>	--	<u>"Duplex" means a residential building with two attached dwelling units. See "Two (2) family residential structure, attached or detached dwelling units."</u>
<u>"Five (5) family residential structure, attached or detached dwelling units"</u>	--	<u>"Five (5) family residential structure, attached or detached dwelling units" means five (5) dwelling units located on one (1) property. The term means the same thing as "fiveplex."</u>
<u>Fiveplex</u>	--	<u>"Fiveplex" means a residential building with five attached dwelling units. See "Five (5) family residential structure, attached or detached dwelling units."</u>
<u>"Four (4) family residential structure, attached or detached dwelling units"</u>		<u>"Four (4) family residential structure, attached or detached dwelling units" means four (4) dwelling units located on one (1) property. The term means the same thing as "fourplex."</u>
<u>Fourplex</u>	--	<u>"Fourplex" means a residential building with four attached dwelling units. See "Four (4) family residential structure, attached or detached dwelling units."</u>
Multiple-unit housing; multifamily housing; multifamily	"Multiple-unit housing," "multifamily housing," and "multifamily" may be used interchangeably and mean a building or a group of buildings having four (4) or more dwelling units for permanent residential occupancy, not designed or used as transient	"Multiple-unit housing," "multifamily housing," and "multifamily" may be used interchangeably and mean a building or a group of buildings having <del>seven (7)</del> <b>four (4)</b> or more dwelling units for permanent residential occupancy, not designed or used as transient accommodations and not

Term	LMC Definition	Amended Definition
	accommodations and not including hotels and motels. Multifamily units may result from new construction or rehabilitated or conversion of vacant, underutilized, or substandard buildings to multifamily housing.	including hotels and motels. Multifamily units may result from new construction or rehabilitated or conversion of vacant, underutilized, or substandard buildings to multifamily housing.
<b><u>Single-family zones</u></b>	--	<b><u>“Single-family zones” means those zones where single-family detached residences are the predominant land use.</u></b>
<b><u>“Six (6) family residential structure, attached or detached dwelling units”</u></b>		<b><u>“Six (6) family residential structure, attached or detached dwelling units” means four (6) dwelling units located on one (1) property. The term means the same thing as “sixplex.”</u></b>
<b><u>Sixplex</u></b>	--	<b><u>“Sixplex” means a residential building with six attached dwelling units. See “Six (6) family residential structure, attached or detached dwelling units.”</u></b>
Stacked Duplex	“Stacked duplex” means a small- to medium-sized structure that consists of two (2) stacked dwelling units, one (1) on top of the other, both of which face and are entered from the street.	
<b><u>Stacked Flats</u></b>		<b><u>“Stacked flat” means dwelling units in a residential building of no more than three stories on a residential zoned lot in which each floor may be separately rented or owned.</u></b>
<b><u>Townhouse</u></b>		<b><u>“Townhouses” means buildings that contain three or more attached single-family dwelling units that extend from foundation to roof and that have a yard or public way on not less than two sides. Examples may include, but are not limited, to rowhouses, triplexes, fourplexes, fiveplexes, and sixplexes.</u></b>
<b><u>Triplex</u></b>	--	<b><u>“Triplex” means a residential building with three attached dwelling units. See “Three (3)</u></b>



Term	LMC Definition	Amended Definition
		<u>family residential structure, attached or detached dwelling units.</u>
<u>Unit density</u>	--	<u>“Unit density” means the number of dwelling units allowed on a lot, regardless of lot size.</u>

## Section 4 – Applicability

- A. The provisions of this ordinance shall apply to all lots zoned predominantly for residential use.
- B. The provisions of this ordinance do not apply to:
  1. Portions of a lot, parcel, or tract designated with critical areas designated under RCW 36.70A.170 or their buffers as required by RCW 36.70A.170, except for critical aquifer recharge areas where a single-family detached house is an allowed use provided that any requirements to maintain aquifer recharge are met.
  2. A watershed serving a reservoir for potable water if that watershed is or was listed, as of July 23, 2023, as impaired or threatened under section 303(d) of the federal clean water act (33 U.S.C. Sec.1313(d)).
  3. Lots that have been designated urban separators by countywide planning policies as of July 23, 2023.
  4. A lot that was created through the splitting of a single residential lot.

## Section 5 – Unit Density

- A. The permitted unit density on all lots zoned predominantly for residential use is:
  1. Two units per lot, unless zoning permitting higher densities or intensities applies.
  2. Four units per lot on all lots within one-quarter mile walking distance of a major transit stop, unless zoning permitting higher densities or intensities applies.
  3. Four units per lot if at least one unit on the lot is affordable housing meeting the requirements of subsections (D) through (I) below, unless zoning permitting higher densities or intensities applies.
- B. The standards of subsection (A) do not apply to lots after subdivision below 1,000 square feet unless the city has enacted an allowable lot size below 1,000 square feet in the zone.
- C. Accessory dwelling units do not count as units for the purposes of this section.
- D. To qualify for additional units under the affordable housing provisions of Section 5(A), an applicant shall commit to renting or selling the required number of units as affordable housing and meeting the standards of subsections (E) through (I) below.

E. Dwelling units that qualify as affordable housing shall have costs, including utilities other than telephone, that do not exceed 30 percent of the monthly income of a household whose income does not exceed the following percentages of median household income adjusted for household size, for the county where the household is located, as reported by the United States Department of Housing and Urban Development:

1. Rental housing: 60 percent.
2. Owner-occupied housing: 80 percent.

F. The units shall be maintained as affordable for a term of at least 50 years, and the property shall satisfy that commitment and all required affordability and income eligibility conditions.

G. The applicant shall record a covenant or deed restriction that ensures the continuing rental or ownership of units subject to these affordability requirements consistent with the conditions in chapter 84.14 RCW for a period of no less than 50 years.

H. The covenant or deed restriction shall address criteria and policies to maintain public benefit if the property is converted to a use other than that which continues to provide for permanently affordable housing.

I. The units dedicated as affordable housing shall:

1. Be provided in a range of sizes comparable to other units in the development.
2. The number of bedrooms in affordable units shall be in the same proportion as the number of bedrooms in units within the entire development.
3. Generally, be distributed throughout the development and have substantially the same functionality as the other units in the development.

Code recommendations for unit density can be found in Section 7- Dimensional Standards

## Section 6 – Middle Housing Types Allowed

**Subject to the recommended housing types of RCW 36.70A.635(5)**, on all lots zoned predominantly for residential use the following uses are permitted by-right, unless zoning permitting higher densities or intensities than those listed Section 5 of this ordinance applies:

- Duplexes.
- Triplexes.
- Fourplexes.
- Fiveplexes.
- Sixplexes.
- Stacked Flats.
- Townhouses.
- Cottage Housing.
- Courtyard Apartments.

Per Commerce guidelines, a **Tier 2 city, including the City of Lakewood, must permit at least six of the nine middle housing typologies in zones where lots are zoned predominantly for residential use.** Lakewood currently explicitly allows all of these typologies except courtyard apartments and stacked flats. This Ordinance proposes to expand to permit all nine middle housing typologies in the City of Lakewood.

In order to incorporate these middle housing typologies, changes will be needed to be made to **Table 18A.40.110- Allowed Residential Uses by Residential Zoning District** of LMC (new text is shown in underline; deleted text is shown in ~~strikethrough~~):

**Table 18A.40.110- Allowed Residential Uses by Residential Zoning District**

Use	ZONING DISTRICT													
	R1	R2	R3	R4	MR1	MR2	MF1	MF2	MF3	ARC	NC1	NC2	TOC	CBD
Accessory Caretaker's Unit											P	P	P	P
Accessory Dwelling Unit (ADU) <sup>B1</sup>	P	P	P	P	P	P	P	P					P	
Babysitting Care	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Boarding House	C	C	C	C	C									
Cottage Housing <sup>B2</sup>	P	P	P	P										
<b><u>Courtyard Apartments</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>										
Foster Care Facility	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Co-housing (dormitories, fraternities, and sororities)					P	P	P	P	P		P	P		
Detached Single-Family <sup>B3</sup>	P	P	P	P	P	P				P				
Two-Family Residential, attached or detached dwelling units. <b><u>Duplex.</u></b>	P	P	P	P	P	P	P			P	P	P		
Three-Family Residential, attached or detached dwelling units. <b><u>Triplex.</u></b>	P	P	P	P	P	P	P			P	P	P		
Four-family residential, attached or detached dwelling units. <b><u>Fourplex.</u></b>	P	P	P	P	P	P	P	P	P	P	P	P		
Five- and six-family residential, attached or detached dwelling units. <b><u>Fiveplex and Sixplex.</u></b>	P	P	P	P	P	P	P	P	P	P	P	P		
<b><u>Stacked Flats</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>							<b><u>P</u></b>	<b><u>P</u></b>		
Multifamily, <del>seven</del> or more residential units							P	P	P	P	P	P	P	P
<b><u>Townhouse</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>	<b><u>P</u></b>
Mixed Use											P	P	P	P
Family Daycare	P	P	P	P	P	P	P	P	P	P	P	P		
Home Agriculture	P	P	P	P	P	P	P	P	P	P				
Home Occupation	P	P	P	P	P									
Mobile Home Parks			C	C	C									

Use	ZONING DISTRICT													
	R1	R2	R3	R4	MR1	MR2	MF1	MF2	MF3	ARC	NC1	NC2	TOC	CBD
Residential Accessory Building	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Rooms for the use of domestic employees of the owner, lessee, or occupant of the primary dwelling	P	P												
Small craft distillery		P	P	P	P							P	P	P
Specialized senior housing					C	C	C	C	C			P	C	C
Accessory residential use	P	P	P	P	P	P	P	P	P	P	P	P	P	P

## Section 7 – Dimensional Standards

### A. Applicability.

1. The city shall not require through development regulations any standards for middle housing that are more restrictive than those required for detached single-family residences, but may apply any development regulations that are required for detached single-family residences. This includes, but is not limited to, the following types of dimensional standards: building height, setbacks, lot coverage, floor area ratio, lot area and lot dimension, impervious surface, open space, and landscaped area standards.
2. Dimensional standards invalidated by this section are replaced by the dimensional standards provided in this section.

B. Density. Lot area requirements and unit density shall comply with Section 5 of this ordinance. Other restrictions, such as minimum lot area per unit, or maximum number of housing units per acre, are invalid in relationship to the minimum number of units per lot that the city must allow under RCW 36.70A.635.

C. Units per structure. Minimum and maximum numbers of dwelling units per structure for middle housing are invalid, except as provided by the definitions of middle housing types in Section 2 of this ordinance.

D. Maximum building height: 35 feet.

E. Minimum setbacks.

1. The minimum required setbacks are as follows:
  - a. Street or front: 15 feet, except 10 feet for lots with a unit density of three or more.
  - b. Street or front, garage door (where accessed from a street): 20 feet.
  - c. Side street: Five feet.
  - d. Side interior: Five feet, and zero feet for attached units internal to the development.

- e. Rear, without an alley: 15 feet, except 10 feet for lots with a unit density of three or more.
- f. Rear alley: Zero feet, and three feet for a garage door where it is accessed from the alley.

2. Setback projections.

- a. Covered porches and entries may project up to five feet into required front and rear setbacks.
- b. Balconies and bay windows may project up to three feet into required front and rear setbacks.
- c. Required parking spaces may occupy required setbacks.
- d. Other setback projections shall be regulated and measured in accordance with the city’s development regulations.

F. Maximum lot coverage.

1. The maximum lot coverage for middle housing is as follows:

- a. For lots with a unit density of six: 55 percent.
- b. For lots with a unit density of four or five: 50 percent.
- c. For lots with a unit density of three or less: 45 percent.

2. Unless the city has a different pre-existing approach to measuring lot coverage, lot coverage is measured as follows: the total area of a lot covered by buildings or structures divided by the total amount of site area minus any required or planned dedication of public rights-of-way and/or designation of private rights-of-way. Lot coverage does not include building overhangs such as roof eaves, bay windows, or balconies and it does not include paved surfaces.

Table LMC 18A.60.030 Densities and Dimensions - Residential Zones will be amended to the following (new text is shown in underline; deleted text is shown in ~~strikethrough~~):

Table LMC 18A.60.030 Densities and Dimensions - Residential Zones

Density and Dimensional Standards	Zoning Classifications								
	R1	R2	R3	R4	MR1	MR2	MF1	MF2	MF3
Density (units per acre)	<del>7.0/3.5/1.8</del> <u>1.45 DUA</u>	<del>10.3/5.2/2.6</del> <u>2.2 DUA</u>	<del>23.3/11.7/5.9</del> <u>4.8 DUA</u>	<del>30.6/15.3/7.7</del> <u>6.4 DUA</u>	<u>22</u>	<u>35</u>	22	35	54
<u>Minimum Unit Density (units per lot) (B)(1)</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>					

Density and Dimensional Standards	Zoning Classifications								
	R1	R2	R3	R4	MR1	MR2	MF1	MF2	MF3
Lot Size	25,000 GSF	17,000 GSF	7,500 GSF	5,700 GSF	<u>No minimum lot size</u>	<u>No minimum lot size</u>	No minimum lot size	No minimum lot size	No minimum lot size
Building Coverage <b>(B) (2)</b>	<del>45</del> <b>35%</b>	<del>45</del> <b>35%</b>	45%	50%	55%	60%	60%	60%	60%
Impervious Surface	45%	45%	60%	70%	70%	75%	70%	70%	70%
Front yard / street setback	<del>15</del> <b>25</b> ft	<del>15</del> <b>25</b> ft	10 ft	10 ft	5 ft	5 ft	<del>10</del> <b>15</b> ft	<del>10</del> <b>15</b> ft	<del>10</del> <b>15</b> ft
Garage / carport setback	<del>20</del> <b>30</b> ft	<del>20</del> <b>30</b> ft	20 ft	20 ft	20 ft	20 ft	20 ft	20 ft	20 ft
Principal arterial and state highway setback	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft	25 ft
Rear yard setback <b>without an alley</b>	<b>1-3 units:</b> <del>15</del> <b>20</b> ft <b>More than 3 units:</b> <del>10</del> <b>15</b> ft	<b>1-3 units:</b> <del>15</del> <b>20</b> ft <b>More than 3 units:</b> <del>10</del> <b>15</b> ft	10 ft	10 ft	5 ft	5 ft	<del>10</del> <b>15</b> ft	<del>10</del> <b>15</b> ft	<del>10</del> <b>15</b> ft
<b>Rear yard setback with an alley (B) (3)</b>	<b>0 ft</b>	<b>0 ft</b>	<b>0 ft</b>	<b>0 ft</b>	<b>0 ft</b>	<b>0 ft</b>	<b>0 ft</b>	<b>0 ft</b>	<b>0 ft</b>
Interior setback	<b>Attached:</b> <del>0</del> <b>5</b> ft <b>Detached:</b> <del>5</del> <b>8</b> ft	<b>Attached:</b> <del>0</del> <b>5</b> ft <b>Detached:</b> <del>5</del> <b>8</b> ft	<b>Attached:</b> <del>0</del> <b>5</b> ft <b>Detached:</b> <del>5</del> <b>8</b> ft	<b>Attached:</b> <del>0</del> <b>5</b> ft <b>Detached:</b> <del>5</del> <b>8</b> ft	Attached : 0 ft; Detached: 5 ft	Attached : 0 ft; Detached: 5 ft	8 ft	8 ft	8 ft
Building height	35 ft	35 ft	35 ft	35 ft	35 ft	50 ft	45 ft	65 ft	80 ft
Design	Design features shall be required as set forth in Chapter <a href="#">18A.70</a> , Article I.								
Landscaping	Landscaping shall be provided as set forth in Chapter <a href="#">18A.70</a> , Article II.								
Parking	Parking shall conform to the requirements of Chapter <a href="#">18A.80</a> .								

GSF = gross square foot

**LMC 18.60.030.B** – Specific Development Considerations – Residential (R) Maximum Density will also be amended to the following (new text is shown in underline; deleted text is shown in ~~strikethrough~~):

B. Specific Development Considerations.

~~1. Residential (R) Maximum Density~~

~~a. The maximum density requirements for Residential (R) zoning districts are listed as three figures, which are interpreted as follows:~~

~~i. The first number refers to the maximum housing density~~

~~(excluding accessory dwelling units) permitted on lots where additional affordable units are provided according to Chapter~~

~~[18A.90](#) LMC or is located within the Residential/Transit~~

~~Overlay as defined in Chapter [18A.50](#) LMC, Article IV, and do not~~

~~include critical areas or their buffers as defined under LMC Title~~

~~[14](#).~~

~~ii. The second number refers to the maximum housing density (excluding accessory dwelling units) permitted on lots that do not include critical areas or their buffers.~~

~~iii. The third number refers to the maximum housing density (excluding accessory dwelling units) permitted on lots that include critical areas or their buffers.~~

1. For all Residential (R) zoning districts, a minimum of two (2) housing units per lot (excluding accessory dwelling units) are allowed on all lots that meet minimum lot size requirements and do not include critical areas or their buffers, or four (4) housing units per lot where additional affordable units are provided according to Chapter [18A.90](#) LMC or additional units are permitted in locations close to a major transit stop under Chapter [18A.50](#) LMC, Article IV.

a. To qualify for additional units, an applicant shall commit to renting or selling the required number of units as affordable housing and meeting the standards below.

b. Dwelling units that qualify as affordable housing shall have costs, including utilities other than telephone, that do not exceed 30 percent of the monthly income of a household whose income does not exceed the following percentages of median household income adjusted for household size, for the county where the household is located, as reported by the United States Department of Housing and Urban Development:

a. Rental housing: 60 percent.

b. Owner-occupied housing: 80 percent.

- c. The units shall be maintained as affordable for a term of at least 50 years in accordance with RCW 36.70A.635(2)(a), and the property shall satisfy that commitment and all required affordability and income eligibility condition.
  - d. The applicant shall record a covenant or deed restriction that ensures the continuing rental or ownership of units subject to these affordability requirements consistent with the conditions in chapter 84.14 RCW for a period of no less than 50 years.
  - e. The covenant or deed restriction shall address criteria and policies to maintain public benefit if the property is converted to a use other than that which continues to provide for permanently affordable housing.
  - f. The units dedicated as affordable housing shall:
    - i. Be provided in a range of sizes comparable to other units in the development.
    - ii. The number of bedrooms in affordable units shall be in the same proportion as the number of bedrooms in units within the entire development.
    - iii. Generally, be distributed throughout the development and have substantially the same functionality as the other units in the development.
  - g. Minimum and maximum numbers of dwelling units per structure for middle housing are invalid, except as provided by the definitions of middle housing typologies.
  - h. An applicant may also apply the Multifamily Tax Exemption (MFTE) program to its affordable dwelling units, provided the units qualify in accordance with Chapter 3.64
2. The maximum lot coverage is as follows::
    - a. For lots with a unit density of six: 55 percent
    - b. For lots with a unit density of four or five: 50 percent
    - c. For lots with a unit density of three or less: 45 percent
    - d. Unless the city has a different pre-existing approach to measuring lot coverage, lot coverage is measured as follows: the total area of a lot covered by buildings or structures divided by the total amount of site area minus any required or planned dedication of public rights-of-way and/or designation of private rights-of-way. Lot coverage does not include building overhangs such as roof eaves, bay windows, or balconies and it does not include paved surfaces.
  3. The minimum setback for a rear alley is zero feet. It is three feet for a garage door where it is accessed from the alley.
  4. No hard surface areas shall be allowed within the dripline of a significant tree to the maximum extent possible, subject to the tree preservation regulations of Chapter 18A.70, Article III.
  5. The process used for reviewing compliance with middle housing design standards shall be administrative review as described under LMC Chapter 18A.20.

## Section 8 – Design Standards

### A. Applicability.



1. These standards apply to all middle housing types developed with up to six units on a lot. Specific cottage housing and courtyard apartment standards apply only to those types.
2. For the purposes of this section, a “street” refers to any public or private street and does not include alleys.
3. These design standards do not apply to the conversion of a structure to a middle housing type with up to four attached units, if the floor area of the structure does not increase more than 50 percent.

B. Purpose. The purpose of these standards is to:

1. Promote compatibility of middle housing with other residential uses, including single-family houses.
2. De-emphasize garages and driveways as major visual elements along the street.
3. Provide clear and accessible pedestrian routes between buildings and streets.
4. Implement the definitions of cottage housing and courtyard apartments provided by state law.

C. Cottage housing.

1. Open space. Open space shall be provided equal to a minimum 20 percent of the lot size. This may include common open space, private open space, setbacks, critical areas, and other open space.
2. Common open space.
  - a. At least one outdoor common open space is required.
  - b. Common open space shall be provided equal to a minimum of 300 square feet per cottage. Each common open space shall have a minimum dimension of 15 feet on any side.
  - c. Orientation. Common open space shall be bordered by cottages on at least two sides. At least half of cottage units in the development shall abut a common open space and have the primary entrance facing the common open space.
  - d. Parking areas and vehicular areas shall not qualify as common open space.
  - e. Critical areas and their buffers, including steep slopes, shall not qualify as common open space.
3. Entries. All cottages shall feature a roofed porch at least 60 square feet in size with a minimum dimension of five feet on any side facing the street and/or common open space.
4. Community building.
  - a. A cottage housing development shall contain no more than one community building.
  - b. A community building shall have no more than 2,400 square feet of net floor area, excluding attached garages.

c. A community building shall have no minimum off-street parking requirement.

#### D. Courtyard Apartments

##### 1. Common open space

a. At least one outdoor common space is required. The common open space shall be bordered by dwelling units on two or three sides.

b. Common open space shall be a minimum dimension of 15 feet on any side.

3. Entries. Ground-related courtyard apartments shall feature a covered pedestrian entry, such as a covered porch or recessed entry, with minimum weather protection of three feet by three feet, facing the street or common open space.

Article III of Chapter 18A.030 LMC- Discretionary Permits LMC shall be amended to the following (new text is shown in underline; deleted text is shown in ~~strikethrough~~):

#### 18A.30.240 General Provisions

B. Individual cottage units shall contain at least eight hundred (800) and no more than ~~one thousand five hundred (1,500)~~ one thousand six hundred (1,600) square feet of gross floor area. A covenant restricting any increases in unit size after initial construction shall be recorded against the property. Vaulted space shall not be converted into habitable space.

C. A community building of up to ~~two thousand five hundred (2,500)~~ two thousand four hundred (2,400) square feet in size, excluding attached garages, may be provided for the residents of the cottage housing development. Roof pitch, architectural themes, materials and colors shall be consistent with those of the dwelling units within the cottage housing development.

~~D. Accessory dwelling units shall not be permitted in cottage housing developments. [Ord. 726 § 2 (Exh. B), 2019.]~~

#### 18A.30.250 Development Standards

##### D. Setbacks and Building Separation

1. Dwelling units shall have at least a ~~ten (10) twenty (20)~~ foot front setback, ~~five (5) eight (8)~~ foot side yard setback and a ten (10) foot rear setback without an alley; Zero (0) foot rear setback with an alley; Three (3) foot rear setback for a garage door accessed from the alley.

2. Dwelling units shall be separated from one another by a minimum of ~~five (5) ten (10)~~ feet, not including projections.

3. Dwelling units shall maintain a ~~five (5) ten (10)~~ foot separation between buildings.

#### 18A.30.260 Open Space

A. A minimum of ~~three hundred (300) five hundred (500)~~ square feet of common open space shall be provided per dwelling unit.

#### 18A.30.270 Building Design Standards

##### A. Building Height

The maximum building height for dwelling units shall be ~~thirty-five (35) twenty-five (25)~~ feet.

## 18A.30.280 Parking

A ~~minimum~~ maximum of one (1) parking spaces per cottage shall be provided for the entire development. An additional fifteen (15) percent of total required spaces shall be designated for guests. If the lot is within one-half (1/2) mile of a major transit stop, defined as a stop for commuter rail or bus rapid transit, no parking is required if adequate provision of on-street parking facilities is available as determined by the Director.

## Section 9 – Off Street Parking

A. These standards apply to all housing meeting the definition of middle housing in Section 3, except as noted in subsection (C) of this section.

Table 18A.80.030(F) LMC Parking Standards Table, will be amended to the following (new text is shown in underline; deleted text is shown in ~~strikethrough~~).

Table 18A.80.030(F) LMC Parking Standards Table

Use	Unit Measure	Minimum (TDM program-only) <sup>1</sup>	Max	Required Bicycle Parking Spaces
Accessory Dwelling Unit <sup>2</sup>	<u>Per dwelling unit</u>	<u>1</u>	<u>N/A</u>	<u>None</u>
	<u>Per dwelling unit within 1/2 mile of a major transit stop (3)</u>	<u>0/1</u>	<u>N/A</u>	<u>None</u>
Affordable housing units within <del>1/4</del> 1/2 mile of <u>a major transit stop (any type)</u> <sup>3</sup>	Per dwelling unit within <del>1/4</del> 1/2 mile of <u>frequent a major transit stop (any type) service</u> <sup>3</sup>	Studio – <del>0.75-0</del> 1 Bedroom – <del>1-0</del> 2+ bedroom – <del>1.5-0</del>	<u>N/A</u>	<u>1 per 7.5 auto stalls, 3 minimum per building</u>
Single-Family	Per dwelling unit	2	N/A	None
Duplexes <sup>4</sup>	Per dwelling unit	2	N/A	None
	Per dwelling unit within 1/2 mile of <u>frequent a major transit stop service</u> <sup>4</sup>	<u>0</u>	<u>N/A</u>	<u>0.5 per unit</u>
Multifamily structures with four to six units <sup>4</sup>	Per dwelling unit	Studio -1 1 bedroom – 1.25 2+ bedroom – 1.5	N/A	2
	Per dwelling unit within 1/2 mile of a major transit stop	0	N/A	0.5 per unit
Multifamily Structures with seven or more units <sup>5</sup>	Per Dwelling Unit	Studio – 1 1 Bedroom – 1.25 2+ bedroom – 1.5	N/A	1 per 10 auto stalls; 2 minimum per building
	Per dwelling unit within 1/2 mile of a major transit stop	Studio – 0.75 1 bedroom – 1 2+ bedroom – 1.5	N/A	1 per 7.5 auto stalls. 3 minimum per building

<sup>1</sup> See LMC 18A.80.060(H)

Section LMC 18A.80.030.G will be amended to the following (new text is shown in underline; deleted text is shown in ~~strikethrough~~).

**9. Residential parking standards for residential development do not apply to:**

**a. Portions of the city for which the Department of Commerce has certified a parking study in accordance with RCW 36.70A.635(7)(a), in which case off-street parking requirement shall be as provided in the certification from the Department of Commerce.**

Section LMC 18A.30.280A Parking will be amended to the following (new text is shown in underline; deleted text is shown in ~~strikethrough~~).

**Section LMC 18A.30.280A**

A ~~maximum~~ minimum of one (1) parking spaces per cottage shall be provided for the entire development. An additional fifteen (15) percent of total required spaces shall be designated for guests. If the lot is within one-half (1/2) mile of a major transit stop, defined as a stop for commuter rail or bus rapid transit, no parking is required if adequate provision of on-street parking facilities is available as determined by the Director.

## **Section 10 – Infrastructure Standards**

No changes are currently proposed for infrastructure standards

## **Section 11- Severability**

If any section, subsection, clause, sentence, or phrase of this ordinance should be held invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance.

## **Section 12- Authority to Make Necessary Corrections**

The City Clerk and the codifiers of this Ordinance are authorized to make necessary corrections to this Ordinance including, but not limited to, the correction of scrivener’s clerical errors, references, ordinance numbering, section/subsection numbers, and any references thereto.

## **Section 13- Effective Date**

The City Clerk and the codifiers of this Ordinance are authorized to make necessary corrections to this Ordinance including, but not limited to, the correction of scrivener’s clerical errors, references, ordinance numbering, section/subsection numbers, and any references thereto.



# Urban Forest Assessment Report

CITY OF LAKEWOOD



2 0 2 4

## ACKNOWLEDGMENTS

### City of Lakewood

6000 Main Street SW  
Lakewood WA 98499  
253-983-7702



John Caufield, City Manager  
Mary Dodsworth, Parks, Recreation, and Community Services Director  
Davi de la Cruz, Parks Development Project Manager  
Tiffany Speir, Planning Division Manager and Lead Staff  
Troy Schlepp, GIS analyst

### Prepared for the City of Lakewood by:

#### Facet

750 6<sup>th</sup> Street S  
Kirkland, WA 98033  
425.822.5242

Kim Frappier, Project Manager/Senior Urban Forester  
Nathan Burroughs, GIS Analyst  
Sam Payne, Ecologist/Arborist  
Lars Freeman-Wood, Arborist



*The information contained in this report is based on the application of technical guidelines currently accepted as the best available science and arboriculture industry standards. All discussions, conclusions, and recommendations reflect the best professional judgment of the author(s) and are based on information available at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, state, and federal regulatory authorities. No other warranty, expressed or implied, is made.*

# Executive Summary

Located in Pierce County in the southern Puget Sound region, Lakewood, Washington has a culturally diverse population of nearly 68,000 residents. Visitors and residents enjoy extensive parks, open spaces, and a thriving business community. Lakewood's collective natural resources and green assets directly contribute to the community's character and provide valuable ecological, economic, and public health benefits.

The City's 2025 Comprehensive Plan includes a goal to “[m]aintain an urban forestry program to preserve significant trees, promote tree health, and increase tree coverage citywide [as well as] work towards a citywide goal of 40% tree canopy cover by the year 2050.” The primary objectives of the project were to gain a deeper understanding of the urban forest at various scales and across land ownership. Study elements included:

- geospatial analysis of canopy cover and plantable space using remote sensing;
- field inventory of publicly managed trees (e.g., rights-of-way, parks); and
- rapid field assessment of select large-acreage natural areas using the Forest Landscape Assessment Tool.

This report does not direct or recommend any actions to be taken by the City or the public. The intention is to use these data to guide the development of an urban forestry management plan and program and serve as a foundation for:

- conducting on-the-ground management of public trees;
- developing or updating the City's land use policies;
- future funding decisions for urban forestry and climate change & resiliency activities; and
- ongoing and future partnerships between the City, its agency and utility partners, and its residents and businesses.

The urban tree canopy assessment determined a citywide canopy cover estimate of 24.4% for the 2020 evaluation year. Canopy cover is reported for census block groups, land use zones, and select large individual properties. In addition to canopy cover, the assessment included an analysis of plantable area conducted at two scales, the contextual level (among census blocks and land use zones) and site level, providing operational support to Lakewood by assessing plantable areas on city-managed lands. Together they provide data to evaluate the opportunity for additional tree planting and tree canopy recovery.

The 2024 field tree inventory assessed 11,782 trees within public rights-of-way, city-owned parks, public schools, and other select public institutional grounds. Results show a public tree population that includes 161 species characterized by a mixture of ornamentally introduced tree varieties and trees native to the Pacific Northwest. The most abundant tree species are Douglas-fir (*Pseudotsuga menziesii*), Oregon white oak (*Quercus garryana*), Norway maple (*Acer platanoides*), cherry plum (*Prunus cerasifera*), and red maple (*Acer rubrum*), which together make up over half of all inventoried

trees (54%). The study found that the population distribution is relatively even among size classes, and a majority of the trees were assessed to be in *good* condition (73%).

Natural sites assessed using FLAT included Fort Steilacoom Park, Seely Lake Park, Wards Lake Park, and the South Puget Sound Wildlife Area. Of the inventoried natural areas, 28% of these lands have been assessed to have an overstory composition well suited for the site and ecoregion. These include forests with an abundance of conifers, madrones, and Oregon white oak, as well as wetlands that have water regimes that would not support a forested ecosystem. Invasive species are prevalent across the City with 35% of natural areas having high levels of invasive species (defined as having greater than 50% cover).

For other large-acreage properties and census tracts under 35% urban tree canopy, LiDAR analysis was utilized to determine site-specific canopy cover, tree count, and height distribution of trees on these sites. The information provided in tree demographics can be used to infer past management practices and evaluate needs or opportunities for future planting efforts.

The Lakewood Urban Forest Assessment Report synthesizes the results of this multi-faceted study and intends to serve as a guide for City staff, the Public Works Department, and Lakewood City Council, as they collaboratively develop programs and policies to steward a sustainable, climate-resilient, and equitably distributed urban and community forest.



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# 1. Purpose and Approach of the 2024 Lakewood Urban Forest Assessment

Urban forests include the trees and vegetation found in natural areas, formal parks, public spaces, private properties, and transportation corridors. Trees in heavily urbanized environments, especially right-of-way (ROW) and street trees, help to mitigate the effects of the built environment and provide numerous environmental and public health benefits, including stormwater mitigation; shade and urban cooling; improved air quality; noise abatement; economic advantages; human health and wellness; and traffic calming. To support the City's Comprehensive Plan goal to achieve 40% tree canopy by 2050, the City Council commissioned this study to obtain foundational information to support the development of an urban forestry program. This data will inform the development of urban forest policies and regulations and guide the maintenance of public trees. Overall, the City seeks to steward an urban forest that is climate-resilient and equitably distributed across various neighborhoods and land uses.

Several dimensions of urban forest metrics are evaluated including:

- field inventory of public trees and select public institutional grounds;
- forest health assessment in natural areas;
- canopy cover analysis; and
- evaluation of available plantable area.

This provides data that can be used to understand the baseline condition of the urban forest and aid in future planning and operations. Ultimately, the findings of this study will serve as a roadmap for strengthening Lakewood's urban forest and achieving its long-term vision of a greener, healthier, and more climate-resilient urban environment.

## 2. Methods

To meet the City's objectives, this urban forest assessment provides a three-tiered approach to provide a comprehensive evaluation compatible with Washington Department of Natural Resources (WADNR) Urban and Community Forestry data requirements and project budget constraints, including:

- geospatial analysis to assess canopy cover and plantable area;
- a field-based individual tree inventory; and
- a forest stand assessment of natural areas.

The individual tree inventory was conducted in the rights-of-way, public parks, and select public institutional grounds. All properties owned by state agencies and public institutions were completed with permission from the landowner. Although a complete tree census is not performed, a large sample is collected that is generally representative of the City's public tree infrastructure. This demographic information may be utilized to guide urban forest operations and maintenance and effectively plan and manage a forest composition and structure to meet the City's desired compositional objectives.

Natural areas were assessed using the Forest Landscape Assessment Tool (FLAT) (see Section 2.4.1). FLAT provides information for forest and natural area management at the stand-level and considers ecosystem metrics beyond trees to systematically categorize and prioritize management actions. This allows for informed ecosystem-level forest management the city can leverage to plan and manage these natural areas.

The third component was a city-scale remote sensing analysis using LiDAR<sup>1</sup> and other data to analyze tree canopy cover and locate areas suitable for potential tree planting (i.e., plantable areas). This approach is well suited to evaluate progress in tree canopy and equity goals and provides city-scale data, including private properties, that are otherwise inaccessible to on-the-ground tree inventory methods. The plantable area analysis will allow the City to understand opportunities for additional tree planting and strategically plan future tree-planting efforts. All analyses were conducted within the city limits. LiDAR analyses were also completed for two locations outside of the city limits, Camp Murray and Meadowbrook Golf Course, to assist with future partnerships on interagency parks and open space improvements. Figure 1 shows the complete study area of the Lakewood Urban Forest Assessment.

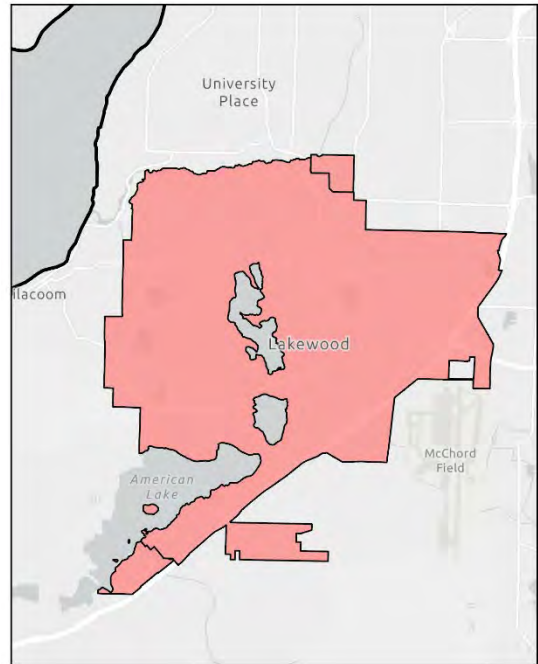


Figure 1. Urban forest assessment study area

<sup>1</sup> LiDAR (Light Detection and Ranging) is a remote sensing technology that generates a digital "point cloud" or 3D image of tree cover and the elevation of bare ground which can be used to evaluate canopy height among other forest assessment elements.

## 2.1 Tree Canopy Analysis

Tree canopy cover is one of the most encompassing metric to describe the overall condition of a city's urban forest and is commonly used to set policy goals and evaluate performance through time. This analysis is provided to determine overall canopy cover in Lakewood and geographically segmented areas including zoning districts and census block groups. These groups are selected to be useful for city planning and management and provide increased granularity compared to city-scale metrics. Large privately owned parcels are also evaluated due to their relative importance in the overall canopy.

The canopy cover layer was created using WADNR's latest LiDAR data for Pierce County (WADNR, 2020) and WADNR's landcover layer available for Pierce County (WADNR, 2022). The LiDAR data contains a bare earth digital elevation model (DEM) and a digital surface model (DSM) consisting of surface first-contact elevations, such as trees and buildings. An object height raster was created by calculating the elevation difference between the DSM and DEM, a layer that includes tree canopies in addition to buildings, utility lines, and other objects. All areas below 10 feet were removed to eliminate non-target objects below the height threshold. To eliminate non-target objects above the height threshold, impervious surfaces on the DNR Landcover Dataset were removed. Additionally, the canopy polygons were aggregated, and infrequent occurrences of utility lines and other non-tree objects were removed. The tree canopy layer was further refined with data from the tree inventory by adding individual canopy polygons using measured radii (see Section 2.3).

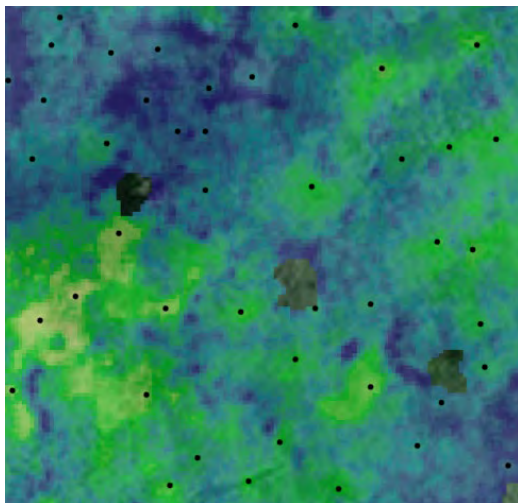


Figure 3. LiDAR-derived canopy height model and tree points making the canopy crown.

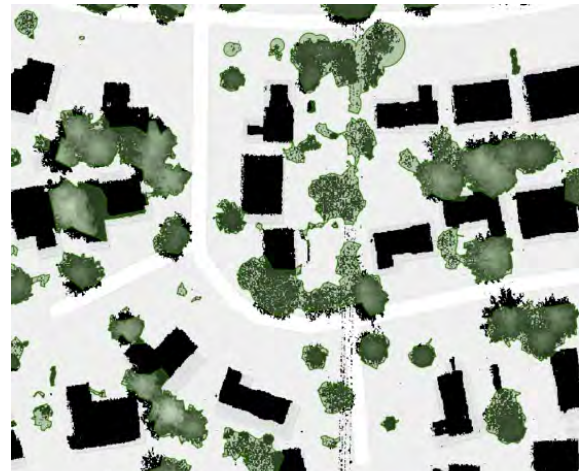


Figure 2. Image of Lidar-derived tree canopy layer.

After creating the canopy layer, additional canopy height modeling was completed in select census block groups and large acreage properties to provide information on urban forest structure. The canopy height model (CHM) used the same LiDAR datasets as the canopy layer. The CHM was completed using 'LidR,' an open-source software package integrated into the R ecosystem for applications in forestry. Canopy height model and tree top identification algorithms were applied to identify tree heights. Tree height was used as a proxy for the overall tree since other common metrics (e.g., diameter-at-breast height (DBH) and age), cannot be directly measured with

remote sensing technologies. This process yielded a tree population point layer with canopy height attribute values.

Both the canopy and tree population data were used to analyze canopy cover in Lakewood and among census block groups and zoning districts. Areas of open water greater than 10,000 square feet in the USGS National Hydrography Dataset (USGS 2024) were removed from the analysis for land area metrics. The canopy analysis study area includes numerous census block groups that straddle the boundaries of Lakewood and adjacent cities' boundaries. These groups were included in city-wide calculations for canopy cover, but because they are insignificant areas and provide no practical information for urban forest management, they were not separately reported.

## 2.2 Planting Site Assessment

Plantable area is defined as a permeable area without current tree cover that may be able to support a tree(s). This excludes areas that contain land cover that may be restored to a condition that may support trees, such as pavement. An analysis of plantable area was conducted at both a contextual level and a site level to evaluate the opportunity for additional tree planting and tree canopy recovery.

The goal of the contextual-level planting analysis was to assess plantable area among individual census block groups and zoning districts. This was completed through an overlay analysis to identify lands that are not:

- overlapped by incompatible infrastructure as indicated by impervious surfaces (PlanIT Geo 2022);
- National Hydrography Dataset (NHD) waters greater than 10,000 square feet (USGS 2024);
- landcover waters (PlanIT Geo 2022); or
- existing canopy generated in this study that approximates the current canopy conditions based on the latest and most accurate available data.

The objective of the site-level planting analysis was to assess plantable area on City-managed lands, such as public parks and ROW. A list of sites assessed for the site-level planting analysis is provided in Table 8. This analysis also incorporated the new GIS tree canopy layer (as described in Section 2.1) and the City of Lakewood's planimetric data (Lakewood, 1998). Lakewood's planimetric data was manually updated by Facet, using a visual observation method, and used as a proxy for impervious surfaces. The identified plantable areas were outside of both the planimetric (i.e., impervious) data and mapped areas of estimated tree canopy cover. The resultant planting assessment data approximately describes conditions in 2020 as that was the latest available LiDAR data. Data is presented at a resolution that reflects the accuracy of source information, approximately 1-10 feet.

Note: The accuracy of the planting analysis methodology relies on the accuracy and precision of the underlying source data. Limitations in both accuracy and resolution as well as temporal precision apply.

## 2.3 Tree Inventory

Tree inventories are an essential component of urban streetscape management, similar to other city asset inventories. They are a foundational data source for tracking all related expenses, defining levels of service, and strategic planning. Public tree inventories help to inform budget forecasting based on tree attributes (e.g. size, age, condition, etc.) so that annual costs for tree care can be anticipated and then distributed strategically over many years.

Lakewood's green assets include individual and collective tree resources, street tree infrastructure (e.g., tree grates), landscape vegetation, and irrigation. In 2018, the City first invested in a field inventory of public trees through a WADNR Urban and Community Forestry grant. The 2018 study examined approximately 1,500 trees located along the ROW of select city arterial streets and city parks and included an estimation of the appraised value and identification of maintenance requirements (Community Forestry Consultants, 2018). This 2024 inventory reevaluated these sites and expanded the study to over 11,000 trees. Additionally, all associated GIS data was provided to the City to assist with future tree management and tracking and included geographically located tree points, attribute data, and photographs.

### 2.3.1 Field Inventory Methods

International Society of Arboriculture (ISA) Certified Arborists® from Facet collected data using Field Maps for ArcGIS, a mobile data collection app from Esri. A data point was added for each inventoried tree, using Esri aerial photography as well as the City's GIS right-of-way (ROW) boundary data as a reference. GPS data are believed reliable for general planning and most regulatory purposes. However, accuracy can be variable, and locations should not be considered equivalent to a professional land survey. Data was collected for all trees greater than two inches DBH between June and October 2024, using the attributes outlined below. The trees were fully leafed out at the time of the inventory.

### 2.3.2 Study Area and Tree Locations

The study area included a selection of City-owned ROW and developed parks and a selection of public institutional grounds. The ROW portion of this inventory focuses on principal arterials, minor arterials, and collector streets. Street trees include trees growing in planting strips, medians or tree wells between the street and sidewalk, or tree wells cut into the backside of the sidewalk. In areas of unimproved ROW, or where the ROW was incorporated into the adjacent private landowner landscaping, Facet arborists used the City ROW GIS boundary to delineate the public ROW. Table 1 provides a summary of all sites included in the individual tree inventory.



Table 1. Tree inventory study locations.

City of Lakewood	Public Institutional Grounds	Other
<ul style="list-style-type: none"> <li>• Public rights-of-way (ROW)</li> <li>• Active Park</li> <li>• American Lake Park</li> <li>• Edgewater Park</li> <li>• Harry Todd Park</li> <li>• Kiwanis Park</li> <li>• Oakbrook Park</li> <li>• Ponders Park</li> <li>• Primley Park</li> <li>• Springbrook Park</li> <li>• Washington Park</li> <li>• Active Park</li> <li>• American Lake Park</li> </ul>	<ul style="list-style-type: none"> <li>• Clover Park High School</li> <li>• Custer Elementary School</li> <li>• Dower Elementary School</li> <li>• Dr. Claudia Thomas Middle School</li> <li>• Early Learning Sites</li> <li>• Hudtloff Middle School</li> <li>• Idlewild Elementary school</li> <li>• Lake Louise Elementary School</li> <li>• Lakes High School</li> <li>• Lakeview Hope Elementary School</li> <li>• Lochburn Middle School</li> <li>• Oakbrook Elementary School</li> <li>• Tillicum Elementary School</li> <li>• Tyee Park Elementary School</li> <li>• Clover Park Technical College Campus<sup>1</sup></li> <li>• Pierce College Campus</li> <li>• Saint Clare Hospital Campus</li> </ul>	<ul style="list-style-type: none"> <li>• JBLM North Clear Zone<sup>2</sup></li> <li>• Utility-owned properties</li> </ul>

<sup>1</sup>Clover Park Technical College has an existing tree inventory conducted by Monarch Tree Services. Facet did not re-inventory this site. The raw data was not available for integration into this study, however, the report was provided to the City by the college.

<sup>2</sup> The North Clear Zone (NCZ) is a federally designated 3,000 x 3,000-foot safety area adjacent to the north end of the McChord Field runway. It is located partly within Joint Base Lewis-McChord (JBLM) and partly within the City of Lakewood.

### 2.3.3 Tree Attributes

#### Species

The arborists determined tree species by analyzing the characteristics of each tree, including canopy morphology and branch structure, bud shape and arrangement, bark texture, and leaves. Both botanical and common names were recorded. Where specific varieties and cultivars were identified, those were included as well.

#### Diameter

The diameter-at-breast height (DBH) was measured at 4.5 feet above the ground with a graduated logger’s tape, except when codominant leaders bulged at 4.5 feet above the ground, in which case the diameter measurement was taken below the combined trunks. The total diameter of multi-stemmed trees was calculated by taking the square root of the sum of each diameter squared.

## Condition

A Level 1 visual assessment was used to evaluate the health and condition of trees within the study area per International Society of Arboriculture (ISA) and Council of Tree and Landscape Appraisers (CTLA) standards. The condition determination was based on current conditions and considered the health, structural integrity, and form of the tree in addition to the characteristics of each species. Each tree was rated from *Excellent* to *Dead* condition, as defined in Table 2. Locations where previously inventoried trees had been removed were documented as *Gone*. Notes on large wounds, structural defects, or specific pruning and maintenance recommendations were recorded.

**Table 2.** Tree condition rating definitions (adapted from CTLA, 2020)

Rating Category	Condition Components		
	Health	Structure	Form
Excellent 1	High vigor and nearly perfect health with little or no twig dieback, discoloration, or defoliation.	Nearly ideal and free of defects.	Nearly ideal for the species. Generally symmetric. Consistent with the intended use.
Good 2	Vigor is normal for species. No significant damage due to diseases or pests. Any twig dieback, defoliation, or discoloration is minor.	Well-developed structure. Defects are minor and can be corrected.	Minor asymmetries/deviations from species norm. Mostly consistent with the intended use. Function and aesthetics are not compromised.
Fair 3	Reduced vigor. Damage due to insects or diseases may be significant and associated with defoliation but is not likely to be fatal. Twig dieback, defoliation, discoloration, and/or dead branches may compromise up to 50% of the crown.	A single defect of a significant nature or multiple moderate defects. Defects are not practical to correct or would require multiple treatments over several years.	Major asymmetries/deviations from species norm and/or intended use. Function and/or aesthetics are compromised.
Poor 4	Unhealthy and declining in appearance. Poor vigor. Low foliage density and poor foliage color are present. Potentially fatal pest infestation. Extensive twig and/or branch dieback.	A single serious defect or multiple significant defects. Recent change in tree orientation. Observed structural problems cannot be corrected. Failure may occur at any time.	Largely asymmetric/abnormal. Detracts from intended use and/or aesthetics to a significant degree.
Very Poor 5	Poor vigor. Appears dying and in the last stages of life. Little live foliage.	Single or multiple severe defects. Failure is probable or imminent.	Visually unappealing. Provides little or no function in the landscape.
Dead 6	N/A	N/A	N/A

## Infrastructure Type & Noted Conflicts

The type of infrastructure surrounding the inventoried tree was documented as either a tree well, planter bed, median, or other as described in Table 3 below.

Table 3. Attributes: Infrastructure types

Type	Description
Tree Well	Enclosed tree pit with impermeable surface on four sides
Planter Bed <sup>1</sup>	Plater area with multiple trees in long strips
Median	Planter area in the center of the road
Unimproved ROW	Tree in ROW where no sidewalk or curb is present
Open space	Parks or wide-open planting areas

<sup>1</sup> The size (in feet) of all planter beds was noted (for example: 4 feet by 6 feet).

Where there were conflicts with tree parts and the adjacent infrastructure, a yes or no response was recorded for the following fields defined in Table 4 below.

Table 4. Observed infrastructure conflicts

Conflict	Description
Tree Grate Girdled	Contact between trunk and grate.
Tree Grate Lifted	The tree grate is lifted at least 0.5" above grade.
Sidewalk Lifted	The sidewalk is lifted at least 0.5" above grade.
Root Sidewalk Intrusion	Cracking was observed in the sidewalk, due to root growth.
Root Road Intrusion	Cracking observed in the street, due to root growth.
Overhead Utilities	Power lines within the expected mature canopy area.

## 2.4 Forest and Natural Area Health Assessment

This chapter covers the specific methodology used to assess the current conditions of open spaces and reviews the results of the field analysis. The forest health assessment was conducted using the Forest Landscape Assessment Tool (FLAT) in four selected parks and wildlife areas, including Fort Steilacoom Park, Seeley Lake Park, Wards Lake Park; and the South Puget Sound Wildlife Area (See Table 5).

Table 5. Forest Landscape Assessment Tool (FLAT) Properties

Site Name	Ownership	Acreage
Fort Steilacoom Park	City of Lakewood/Pierce College	340
Wards Lake Park	City of Lakewood	22
Seeley Lake Park	Pierce County	47
South Puget Sound Wildlife Area	WA Department of Natural Resources	100

Assessing the condition of undeveloped public open spaces, including forests, meadows, prairies, and wetlands allows land managers to establish restoration needs and priorities, develop site-specific restoration plans, and enable a quantitative evaluation of the effectiveness of future restoration actions. FLAT data attributes cover several metrics and indicators of ecosystem functions and processes, which capture additional information beyond what is gathered from an inventory of individual significant trees.

### 2.4.1 Forest Landscape Assessment Tool (FLAT)

The Forest Landscape Assessment Tool (FLAT) was developed by the Green Cities Research Alliance in coordination with the USDA Forest Service Pacific Northwest Research Station (Ciecko et al., 2016). The FLAT process is a standardized method for rapidly assessing and prioritizing forest health and restoration needs. The complete methodology is described in Ciecko et al. (2016) and the *FLAT Field Manual* by Green Cities Research Alliance (2013).

In this approach, discrete habitat management units (HMUs) are defined at a scale appropriate for site-specific management. Forest metrics are obtained by field researchers and units are assigned a ranked category based on the Tree-iage Matrix, a forest health rating from 1-9. The Tree-iage categories provide a forest health snapshot that can be used by managers to understand site conditions and prioritize maintenance and restoration.

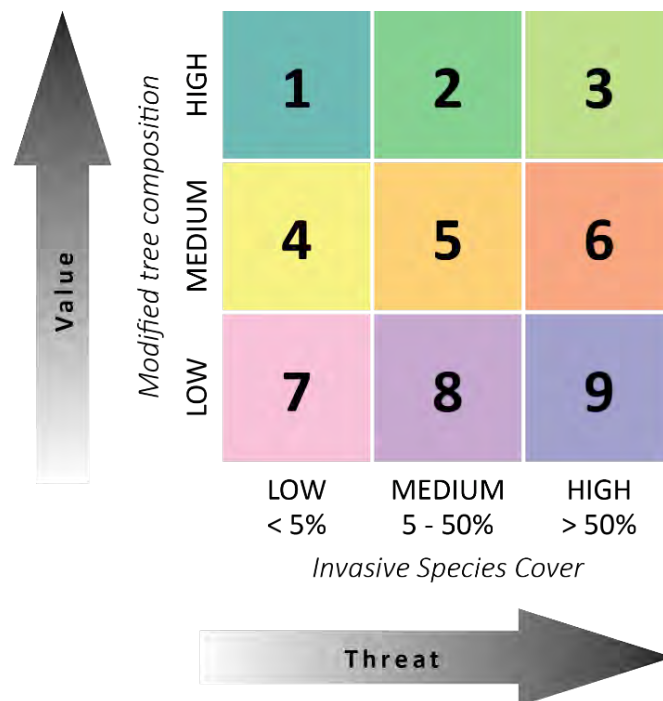


Figure 4. Tree-iage matrix, adapted from Green Cities Research Alliance

Table 6. Tree-age category descriptions<sup>2</sup>

### Category 1, High Canopy Composition – Low Invasive Cover

Forests have a high canopy cover and are composed of tree species that are well-suited to the site conditions and ecoregion. Forest canopies typically contain > 50% conifers or broadleaf evergreen trees. This category also includes wetlands and floodplains where deciduous forest, scrub-shrub, or emergent plant communities are supported under natural conditions. Invasive species cover is less than 5% and poses minimal threat.

### Category 2, High Canopy Composition – Medium Invasive Cover

Forests have a high canopy cover and are composed of tree species that are well-suited to the site conditions and ecoregion. Forest canopies typically contain > 50% conifers or broadleaf evergreen trees. This category also includes wetlands and floodplains where deciduous forest, scrub-shrub, or emergent plant communities are supported under natural conditions. Invasive species cover is between 5-50% and poses a moderate threat. If left untreated, invasive species may reduce the viability of native seedlings, compete for resources, and in severe cases impact the health of mature trees.

### Category 3, High Canopy Composition – High Invasive Cover

Forests have a high canopy cover and are composed of tree species that are well-suited to the site conditions and ecoregion. Forest canopies typically contain > 50% conifers or broadleaf evergreen trees. This category also includes wetlands and floodplains where deciduous forest, scrub-shrub, or emergent plant communities are supported under natural conditions. Invasive species cover is extremely pervasive and ranges between 50-100%. If left untreated, native plant communities, mature trees, and habitats could be lost.

### Category 4, Medium Canopy Composition – Low Invasive Cover

The forest canopy is dominated by native deciduous trees, but site conditions could support between 1-50% cover of conifers and broadleaf evergreen trees. This category also includes wetlands and floodplains that could support between 1-50% conifers or broadleaf evergreen trees. Invasive species cover is less than 5% and poses minimal threat.

### Category 5, Medium Canopy Composition – Medium Invasive Cover

The forest canopy is dominated by native deciduous trees, but site conditions could support between 1-50% cover of conifers and broadleaf evergreen trees. This category also includes wetlands and floodplains that could support between 1-50% conifers or broadleaf evergreen trees. Invasive species cover is between 5-50% and poses a moderate threat. If left untreated, invasive species may reduce the viability of native seedlings, compete for resources, and in severe cases impact the health of mature trees. Competition with native seedlings may disrupt successional pathways and prevent the establishment of late-seral plant communities.

### Category 6, Medium Canopy Composition – High Invasive Cover

The forest canopy is dominated by native deciduous trees, but site conditions could support between 1-50% cover of conifers and broadleaf evergreen trees. This category also includes wetlands and floodplains that could

<sup>2</sup> Green Cities Research Alliance, 2010

support between 1-50% conifers or broadleaf evergreen trees. Invasive species cover is extremely pervasive and ranges between 50-100%. If left untreated, native plant communities, mature trees, and habitat could be lost.

### Category 7, Low Canopy Composition – Low Invasive Cover

Forests in this category have little to no conifers or broadleaf evergreen trees where they would otherwise dominate under natural conditions. Forests in this category are often a legacy of disturbance without assisted revegetation. Invasive species cover is less than 5% and poses minimal threat.

### Category 8, Low Canopy Composition – Medium Invasive Cover

Forests in this category have little to no conifers or broadleaf evergreen trees where they would otherwise dominate under natural conditions. Forests in this category are often a legacy of disturbance without assisted revegetation. Invasive species cover is between 5-50% and poses a moderate threat. If left untreated, invasive species may reduce the viability of native seedlings, compete for resources, and in severe cases impact the health of mature trees. Competition with native seedlings may disrupt successional pathways and prevent the establishment of late-seral plant communities.

### Category 9, Low Canopy Composition – High Invasive Cover

Forests in this category have little to no conifers or broadleaf evergreen trees where they would otherwise dominate under natural conditions. Forests in this category are often a legacy of disturbance without assisted revegetation. Invasive species cover is extremely pervasive and ranges between 50-100%. If left untreated, native plant communities, mature trees, and habitats could be lost.

Several adjustments to the FLAT methodology were applied to adapt the protocol for the conditions in Lakewood's forests and other natural areas, as summarized below:

1. HMUs are assigned to areas less than five acres, with a minimum recorded size of 0.8 acres.
2. The FLAT was not designed to be used in prairie-oak ecosystems. To account for this, the native Oregon white oak is considered in the category of "Conifer or Madrone Cover" in the canopy composition flow chart because it is a desired tree in local ecosystems.
3. HMUs that are managed intentionally as non-forested sites, such as prairies and some prairie-oak ecosystems, are included in the respective category of "Capability to Support Canopy" based on management objectives rather than biological limitations of the site.
4. Several instances were noted in public parks where a non-native tree was the dominant or a large canopy component of an HMU. When management objects do not intend to remove and replace these trees, these are not treated as invasive species for the purpose of the cover estimate.

### 3. Urban Tree Canopy Assessment

#### 3.1 Landcover and Urban Tree Canopy

The City of Lakewood encompasses 19.0 square miles, with a land area of 17.2 square miles and 1.8 square miles of water. The citywide urban tree canopy is estimated to cover 2,660 acres, or 24.4% of the City during the 2020 analysis year (Figure 5). The following are some comparable urban canopy cover estimates in the Puget Sound region: Tacoma (20%), Seattle (28%), Kent (28%), Renton (29%), Maple Valley (31%), Bellevue (37%), and Kirkland (41%) (PlanIT Geo, 2018).

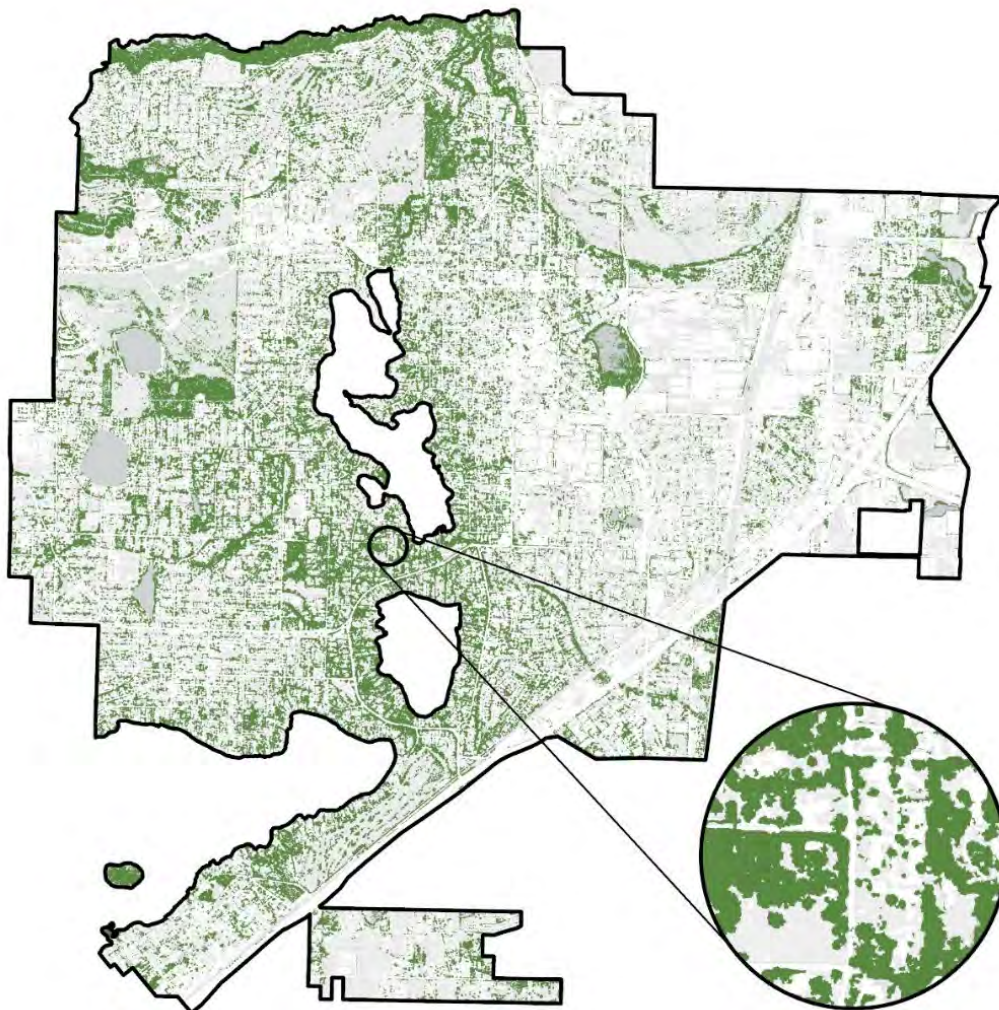


Figure 5. Tree canopy cover in Lakewood city limits.

### 3.2 Contextual-level Planting Site Assessment

The contextual-level planting site assessment revealed planting opportunities throughout Lakewood totaling approximately 3,400 acres of plantable area, or 31.4% of the City. Approximately half of all identified plantable areas would need to be covered in the tree canopy to provide the 15.6% increase necessary to achieve Lakewood’s 40% canopy cover goal (See Figure 6). This result includes lands that are potentially environmentally suitable for trees to grow but may be constrained by other land uses, designations, and infrastructure.

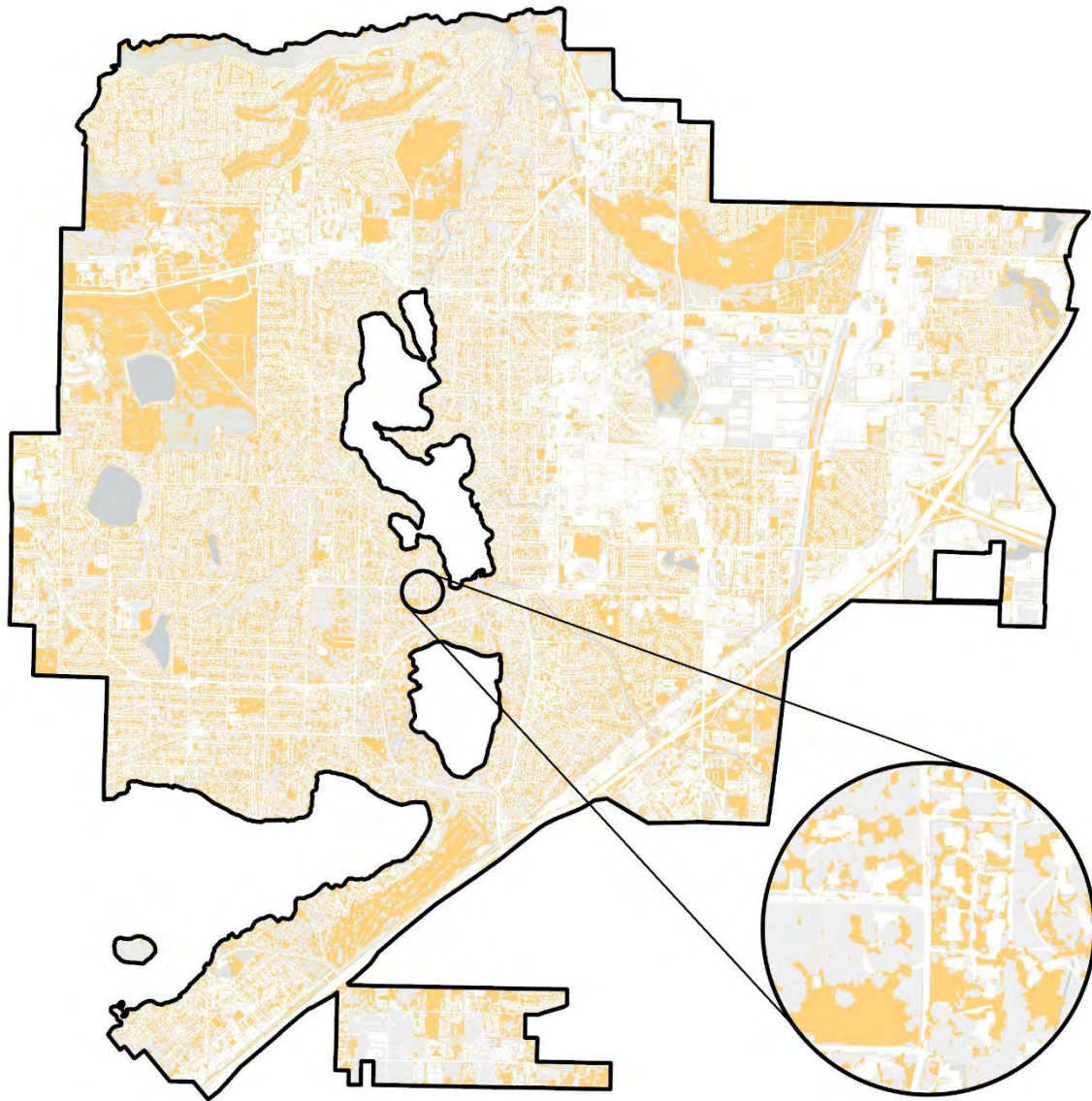


Figure 6. Contextual-level planting area analysis within Lakewood city limits

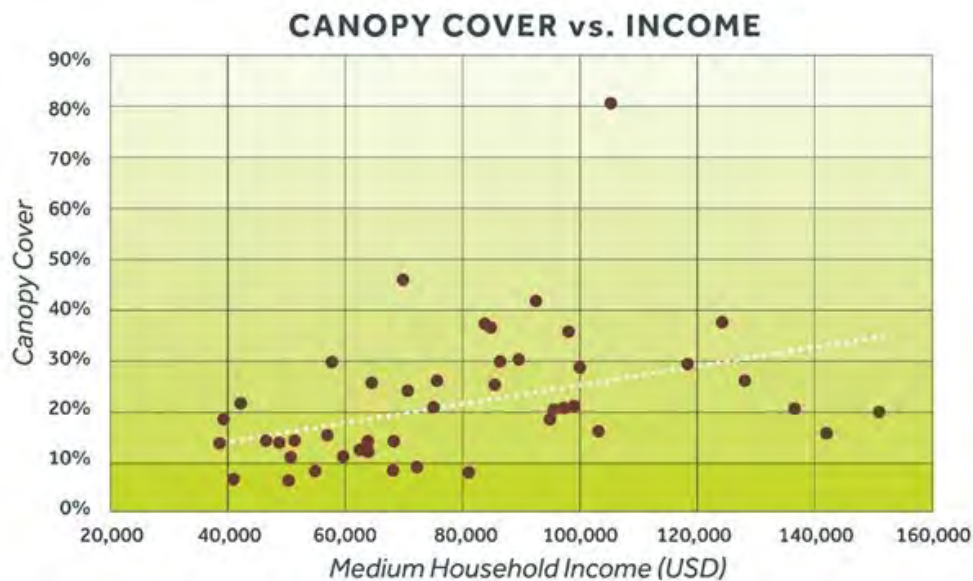


### 3.3 Census Block Groups

Generally speaking, the relationship between urban forest canopy distribution and income and racial inequities is well documented (Fan et al., 2019; Watkins & Gerrish, 2018). Studies show that people with lower incomes do not enjoy the same urban forest and ecological benefits as higher-income neighborhoods (Greene et al., 2018). Affluent, primarily white communities typically have higher canopy cover and larger investments in tree-planting activities (Myers et al., 2023; Watkins et al., 2017). Regional studies indicate that socioeconomic tree inequity trends also exist in Puget Sound (Puget Sound Regional Council, 2024).

Lakewood requested an evaluation of census block groups with relatively low canopy cover (less than 35%) to seek opportunities to improve tree equity. Tree canopy was examined at the census tract and block group level. Of Lakewood's 53 evaluated census block groups, 42 have less than 35% canopy cover. See Appendix A for associated metrics at the census block group level.

The data reveals a positive correlation between canopy cover and income in Lakewood, indicating that areas with higher income levels tend to have greater existing canopy cover (see Figure 7) and areas with lower income have less plantable areas (see Figure 8). Many factors influence urban tree canopy patterns and distribution; for instance, affluent areas typically have larger lot sizes and better access to public parks, translating to proportionately greater opportunities for canopy recovery ( $R^2=0.14$ ). Scatter plot and linear regression showing positive correlation between annual median household income from the 2023 ACS and canopy cover by census block groups ( $R^2 = 0.14$ ). Income data was not available for all evaluated census block groups.



**Figure 7.** Scatter plot and linear regression showing positive correlation between annual median household income from the 2023 ACS and canopy cover by census block groups ( $R^2 = 0.14$ ). Income data was not available for all evaluated census block groups.

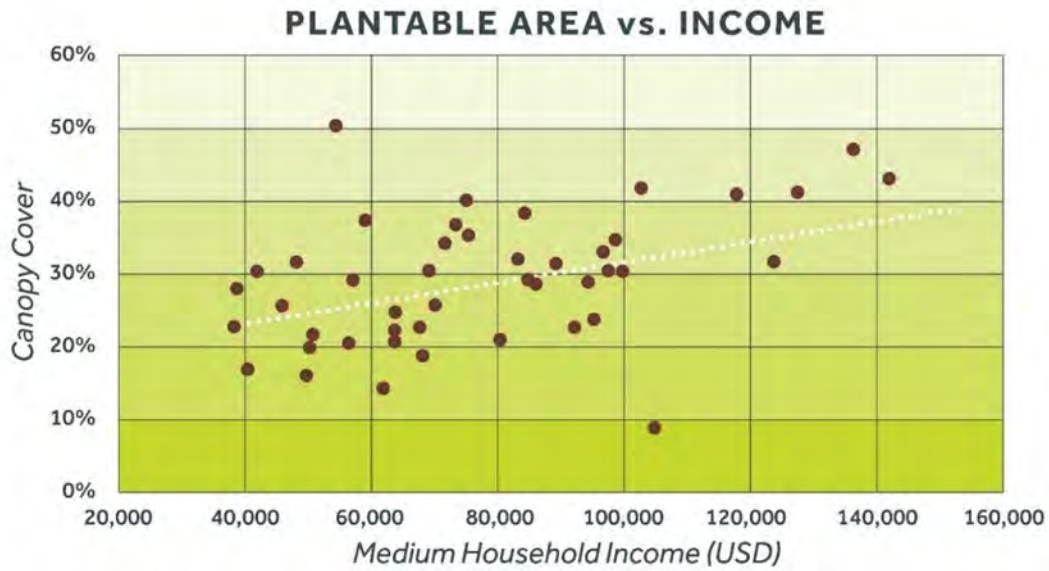


Figure 8. Scatter plot and linear regression showing positive correlation between annual median household income from the 2023 ACS and plantable area by census block groups ( $R^2 = 0.18$ ). Income data was not available for all evaluated census block groups.

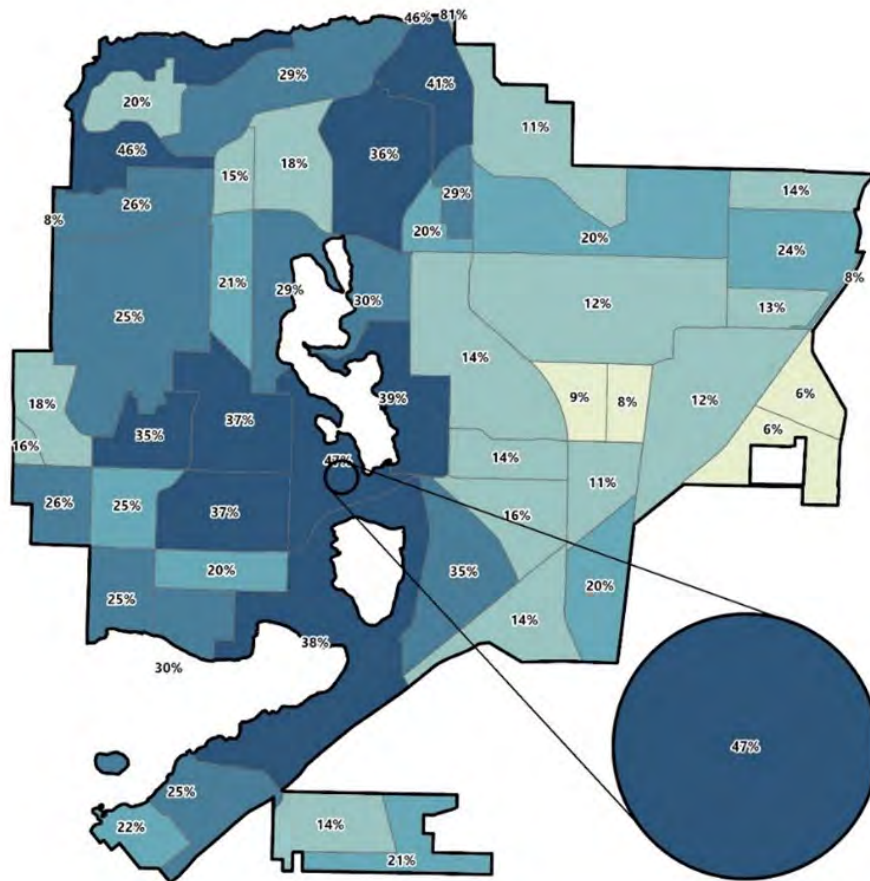


Figure 9. Urban tree canopy percentage by census block groups

### 3.4 Land Use Zoning and Tree Canopy

Urban land use plays an important role in the distribution and structure of urban forest canopy (Mincey et al., 2013). Understanding the distribution of existing and potential canopy within various land use zones, as well as the statutory, regulatory, and environmental restrictions beyond the control of the City, provides useful data that can inform policies and regulations governing urban forest management practices. This is of particular importance for tree removal and retention regulations on private development sites.

Tree canopy cover is relatively high in Lakewood's residential zones, ranging from 23.3%-48.1%. These zones also make up a large proportion of the total city area and collectively account for 59% of Lakewood's total tree canopy area. The open space and recreation zones include 17% of the total canopy. Commercial and industrial zones have low canopy cover values, ranging between 5.4% and 11.3%.

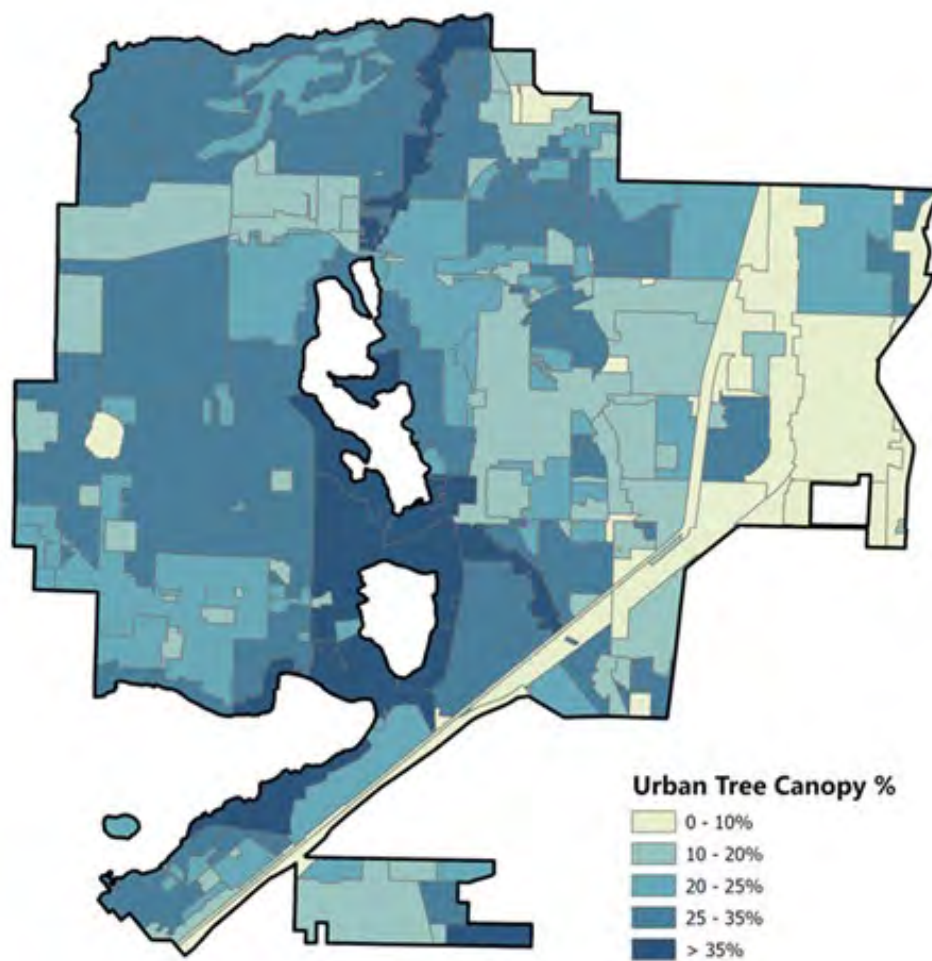


Figure 10. Urban tree canopy percentage by land use zones.

Due to larger lot sizes and lower impervious surface coverage, the availability of plantable area is greatest in the residential and parks & open space land use zones (see Table 7).

- Parks and open space zones have between 57%-66% potential plantable area where trees could be grown if planting aligns with management objectives.
- Residential zones have between 30%-32% potential plantable area, since many properties have yards that can support trees.

**Table 7.** Urban tree canopy and plantable area summary for each zoning district in Lakewood.

Zone	Land Area		Urban Tree Canopy			Plantable Area		
	Acres	A%	Acres	A%	UTC%	Acres	A%	PA%
Air Corridor 1	340.5	3%	33.4	9.8%	1.3%	70.4	21%	2.1%
Air Corridor 2	233.5	2%	49.7	21.3%	1.9%	63.3	27%	1.8%
Arterial Residential/Commercial	21.1	0%	5.1	24.3%	0.2%	5.2	25%	0.2%
Central Business District	336.7	3%	37.2	11.1%	1.4%	32.1	10%	0.9%
Clear Zone	56.8	1%	1.6	2.9%	0.1%	8.0	14%	0.2%
Commercial 1	90.2	1%	4.9	5.4%	0.2%	12.0	13%	0.4%
Commercial 2	302.9	3%	17.0	5.6%	0.6%	36.0	12%	1.0%
Commercial 3	26.2	0%	2.7	10.3%	0.1%	4.9	19%	0.1%
Industrial 1	294.9	3%	18.7	6.3%	0.7%	53.6	18%	1.6%
Industrial 2	31.8	0%	2.5	7.9%	0.1%	3.2	10%	0.1%
Industrial Business Park	436.0	4%	48.0	11.0%	1.8%	84.5	19%	2.5%
Military Lands	25.4	0%	6.1	23.9%	0.2%	9.4	37%	0.3%
Mixed Residential 1	135.5	1%	14.9	11.0%	0.6%	53.5	39%	1.6%
Mixed Residential 2	198.1	2%	46.2	23.3%	1.7%	55.4	28%	1.6%
Multifamily 1	275.6	3%	64.6	23.4%	2.4%	69.6	25%	2.0%
Multifamily 2	273.3	3%	68.9	25.2%	2.6%	72.3	26%	2.1%
Multifamily 3	185.9	2%	29.2	15.7%	1.1%	44.8	24%	1.3%
Neighborhood Commercial 1	19.4	0%	2.2	11.1%	0.1%	3.4	18%	0.1%
Neighborhood Commercial 2	268.5	2%	30.4	11.3%	1.1%	40.5	15%	1.2%
Open Space & Recreation 1	997.4	9%	344.4	34.5%	13.0%	571.0	57%	16.6%
Open Space & Recreation 2	462.4	4%	116.1	25.1%	4.4%	306.4	66%	8.9%
Public Institutional	759.1	7%	134.3	17.7%	5.1%	253.3	33%	7.4%
Residential 1	441.1	4%	212.1	48.1%	8.0%	131.1	30%	3.8%
Residential 2	576.4	5%	258.9	44.9%	9.7%	178.3	31%	5.2%
Residential 3	2,758.3	25%	833.8	30.2%	31.4%	852.3	31%	24.8%
Residential 4	1,131.2	10%	263.2	23.3%	9.9%	362.2	32%	10.6%
Right-of-Way	81.7	1%	3.6	4.4%	0.1%	15.8	19%	0.5%
Transit Oriented Commercial	148.7	1%	9.8	6.6%	0.4%	30.3	20%	0.9%
Water / Open Space/Recreation 1	11.8	0%	0.2	1.5%	0.0%	0.0	0%	0.0%
<b>Totals</b>	<b>10,920.5</b>	<b>100%</b>	<b>2,659.6</b>	<b>24.4%</b>	<b>100%</b>	<b>3431.4</b>	<b>31.4%</b>	<b>100%</b>

A%: Percent land, urban forest canopy area, or plantable area within each census block group.

UTC%: Percent urban forest canopy cover relative to the City total.

PA%: Percent plantable area relative to the City total.

### 3.5 Site-Level Planting Analysis

This planting analysis is intended to provide a map of specific actionable plantable areas in rights-of-way and public properties that Lakewood can use to assist in operations. It also provides a site-level evaluation for select properties. These highlight significant opportunities for tree planting in all evaluated areas. The plantable area layer is provided to Lakewood in GIS format for city management, and an example is shown in Figure 11.

This UFAR's plantable area calculations likely overestimate actual opportunity because no comprehensive dataset exists that can fully predict the extent of current or planned infrastructure conflicts. The accuracy of all planting analysis methodologies also rely on the accuracy of the underlying source data, which may contain limitations in both accuracy and resolution. Additionally, areas identified as physically plantable do not necessarily mean that a site is free of current or future infrastructure conflicts from sources that are not present in available databases.

Certain areas are physically plantable but have incompatible management objectives, such as golf courses and sports fields. However, there may still be opportunities to strategically increase canopy cover in select locations on or around these facilities; therefore, these areas were not removed from the analysis. Further evaluation is needed to determine plantable locations in such situations. Paved areas may also be restored for tree planting opportunities that are not represented in the plantable area analysis.

There is a considerable opportunity for tree planting across the UFAR study area, ranging from approximately 6%-100% of the evaluated sites. If planted strategically and successfully, new trees could significantly increase city-wide canopy and alleviate canopy deserts by 2050.

Public rights-of-way (ROW) were also analyzed for potential plantable areas. A total of 33% of the public ROW is identified as theoretically suitable for planting trees, but the analysis did not account for planned future City's infrastructure improvements and needs (i.e., sidewalk installation, motorized and non-motorized travelway improvements. More analysis must be done to determine a realistic percentage.

As discussed above, this UFAR did not consider the use of current or planned land use when calculating potential plantable areas. However, parks are often the most compatible area for additional tree canopy cover and can be designed to meet multi-benefit objectives. Lakewood's parks have substantial areas of open space suitable for tree planting, with some as high as 89% of plantable area. Fort Steilacoom Park was the largest evaluated park and was estimated to have 71% plantable area, providing a significant opportunity for increasing overall canopy cover.

The public institutional grounds, primarily schools, and medical facilities, were also evaluated to have high levels of potential plantable area given the size of land parcels. However, a large portion of the plantable area on school property was dedicated to sports fields and would not be compatible with tree planting.

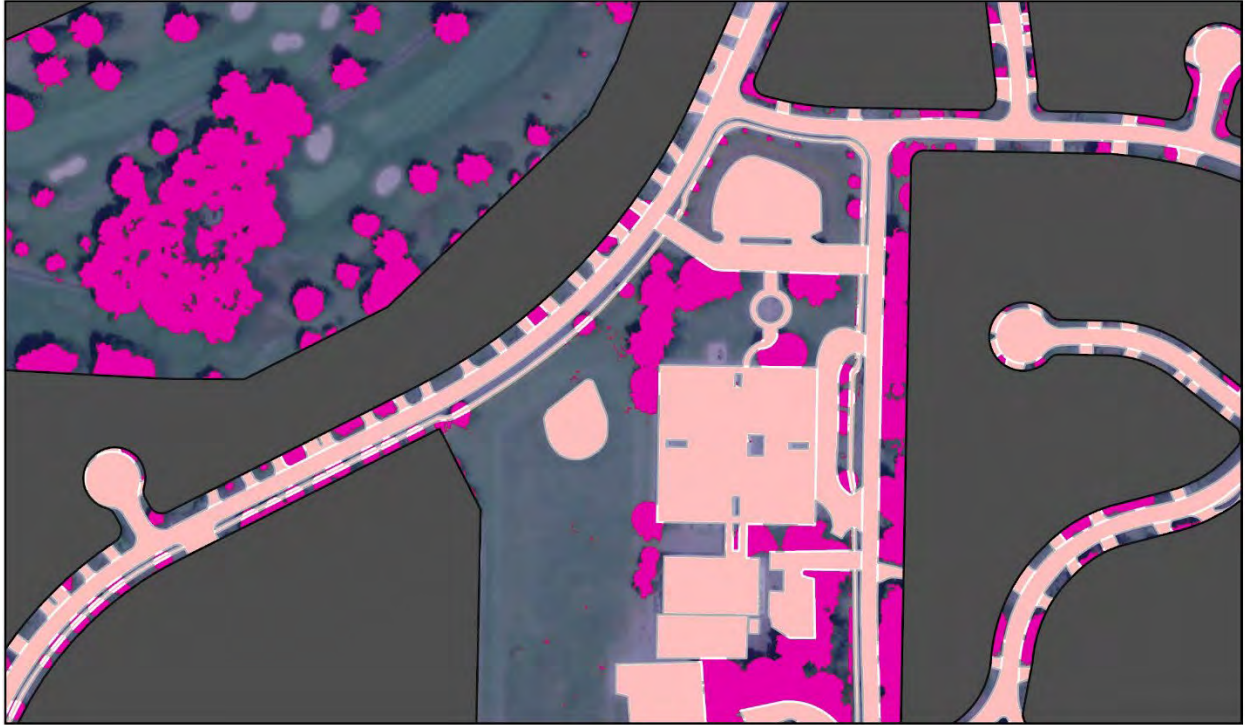


Figure 11. Example of site-level planting analysis. Dark gray areas were excluded from the analysis (e.g. private parcels). Planimetric data (light pink) and tree canopy (bright pink) were excluded as possible planting locations.



Figure 12. Comparison of plantable area available on St. Claire Hospital property (left, 18%) and in the JBLM North Clear Zone (right, 100%).

**Table 8.** Plantable area according to site-level analysis.

Site Name	Type	Total Area (Ac)	Plantable Area (Ac)	Percent Plantable
ROW	ROW	1,673.9	554.8	33%
Active Park	Public Parks	2.3	1.7	76%
American Lake Park	Public Parks	5.5	1.6	29%
Edgewater Park	Public Parks	2.8	2.5	89%
Fort Steilacoom Disc Golf Parcels	Public Parks	86.3	41.6	48%
Fort Steilacoom Park	Public Parks	418.7	296.8	71%
Harry Todd Park	Public Parks	16.8	5.3	31%
Kiwanis Park	Public Parks	2.9	1.4	48%
Oakbrook Park	Public Parks	1.5	0.9	59%
Ponders Park	Public Parks	0.4	0.1	33%
Primley Park	Public Parks	0.2	0.0	6%
Seeley Lake Park	Public Parks	46.8	21.4	46%
South Puget Sound Wildlife Area	Public Parks	90.6	75.6	84%
Springbrook Park	Public Parks	6.9	3.7	53%
Wards Lake Park	Public Parks	38.3	16.3	43%
Washington Park	Public Parks	3.6	2.2	61%
Clover Park High School	Public Inst. Grounds	41.2	15.1	37%
Clover Park Technical College	Public Inst. Grounds	70.7	25.2	36%
Custer Elem. & Hudtloff Mid. School	Public Inst. Grounds	36.9	23.5	64%
Dower Elementary School	Public Inst. Grounds	8.5	3.6	42%
Dr. Claudia Thomas Middle School	Public Inst. Grounds	21.5	8.5	40%
Early Learning School	Public Inst. Grounds	8.2	3.2	39%
Idlewild Elementary School	Public Inst. Grounds	9.2	4.5	49%
Lake Louise Elementary School	Public Inst. Grounds	9.0	3.8	42%
Lakes High School	Public Inst. Grounds	38.7	20.6	53%
Lakeview Hope Elementary School	Public Inst. Grounds	9.5	2.9	30%
Lochburn Middle School	Public Inst. Grounds	22.0	10.9	49%
Oakbrook Elementary School	Public Inst. Grounds	9.9	4.9	50%
Pierce College Campus	Public Inst. Grounds	40.5	14.2	35%
St. Clare Hospital Campus	Public Inst. Grounds	24.3	4.3	18%
Tillicum Elementary School	Public Inst. Grounds	5.5	2.3	43%
Tyee Park Elementary School	Public Inst. Grounds	9.9	5.9	60%
Western State Hospital	Public Inst. Grounds	214.6	94.3	44%
Lakewold Gardens	Large Ac. Private Property	9.1	3.2	35%
Oakbrook Golf Course	Large Ac. Private Property	126.9	97.4	77%
Tacoma Golf and Country Club	Large Ac. Private Property	135.4	96.7	71%
JBLM North Clear Zone	Lakewood Clear Zone JBLM	55.5	55.5	100%

### 3.6 Census Tracts with Less than 35% Urban Tree Canopy

Census block groups with less than 35% urban tree canopy cover were evaluated with remote sensing data for urban tree cover and other attributes including population estimates and height distribution. Of the 53 census block groups in Lakewood, 42 have urban tree canopy cover less than 35%. The average canopy cover of these groups is 19.2%, or 5.2% less than the citywide average. Data for each specified census block group in this category is provided in Appendix B. A graphic depiction of the CHM results is shown in Figure 13, indicating the center point and canopy area of each detected tree.

The relatively high abundance of small trees is indicative of a youthful population. Assuming that these trees are young rather than small-stature species, this demographic information highlights an opportunity for canopy growth over time and the presence of regeneration which can provide resilience to aging portions of the urban forest population. Note that this model excludes understory trees as well as all trees less than 10 feet in height, and therefore, is less comprehensive than information from complete tree inventories.

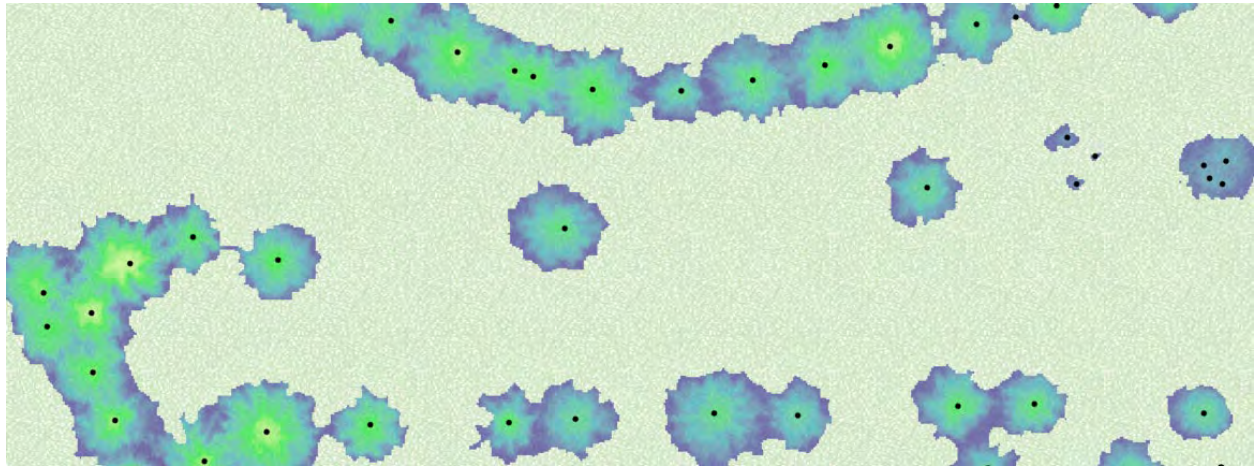


Figure 13. Canopy height model (CHM) overlaid with modeled tree top locations.

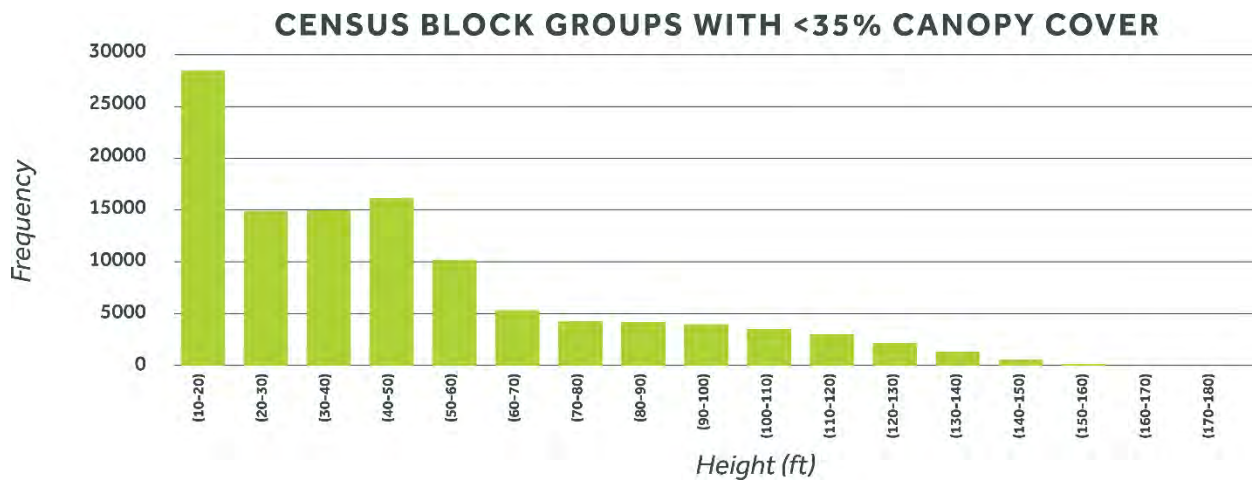


Figure 14. Tree height histogram for all census block groups with canopy cover less than 35%

### 3.7 Large Acreage Properties

Tree canopy cover on the evaluated large acreage public and private sites was generally greater than the City as a whole (Table 9). Lakewold Gardens, the Fort Steilacoom Disc Golf Course, and Camp Murray have notably high canopy cover because they include areas of forest and gardens. Many of these properties also have an opportunity for additional tree planting.



**Table 9.** Canopy cover and tree population estimate in large acreage public and private sites.

Site Name	Ownership Type	Area (ac)	Canopy Cover	Tree Count
Camp Murray	Private	211	43.1%	4,854
Fort Steilacoom Disc Golf Course	Public Park	86	49.3%	2,425
Lakewold Gardens	Private	9	57.5%	220
Meadow Park Golf Course	Private	145	28.6%	2,068
Oakbrook Golf Course	Private	127	22.9%	2,121
Tacoma Golf and Country Club	Private	135	25.1%	2,166
Western State Hospital	Public Institutional Grounds	215	28.2%	4,399

Each of the seven large-acreage parcels has a unique tree height distribution, highlighting variability in past management approaches. Tree height histograms are shown for each property in Figure 15, displaying tree height frequency in bins set at 10-foot intervals. As urban forests reach maturity, the distribution tends to flatten out over time (Morgenroth et al., 2020). Models for ideal urban forest tree distribution typically have a high proportion of smaller trees that gradually decrease relative to size (Morgenroth et al., 2020). Many of the sites have a relatively high proportion of trees between 30-60 feet in height, decline in heights between 70-100 feet, and again increase amongst the tallest trees. Site-specific management recommendations would benefit from field investigation to better understand the species composition and other tree height covariates. Some sites have a relatively small population of younger and smaller trees, which would indicate lower regenerative capacity and resilience to aging forests. Continuous planting over time also aids in increasing age diversity and urban forest resilience, in addition to regeneration.

As urban forests reach maturity, the distribution tends to flatten out over time (Morgenroth et al., 2020). Models for ideal urban forest tree distribution typically have a high proportion of smaller trees that gradually decrease relative to size (Morgenroth et al., 2020). These tree height distribution charts show a relatively small population of younger and smaller trees, which if present, would provide additional stability and resilience. As urban forest tree populations mature, Lakewood may consider replenishing young trees.

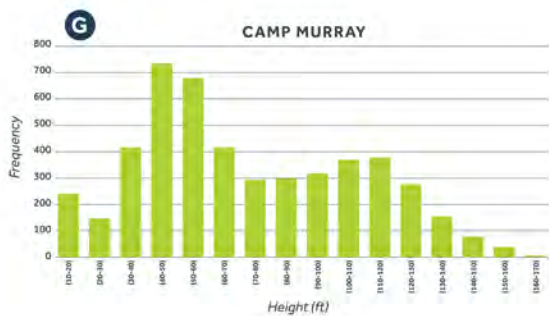
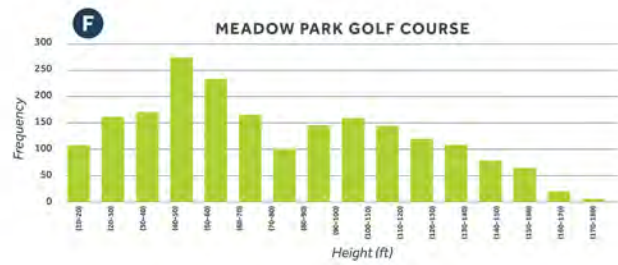
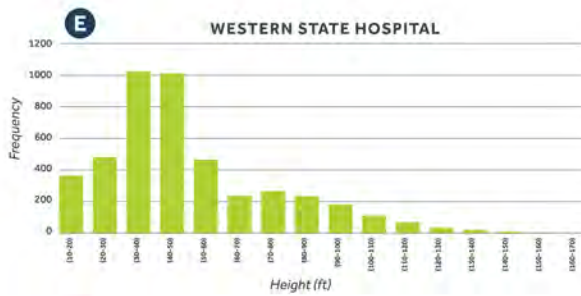
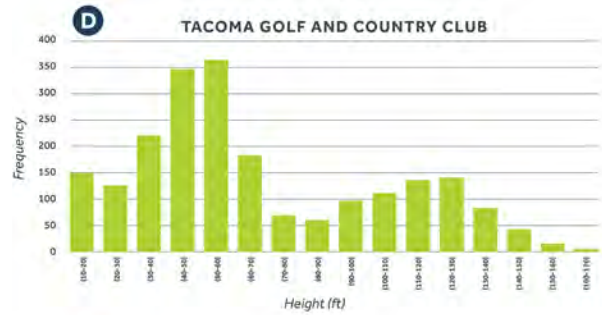
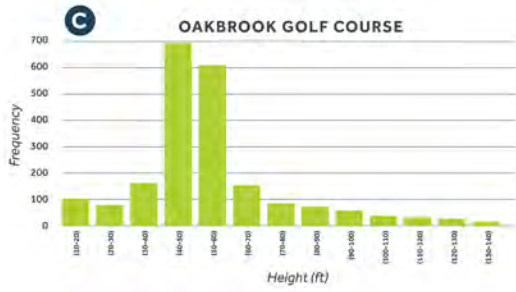
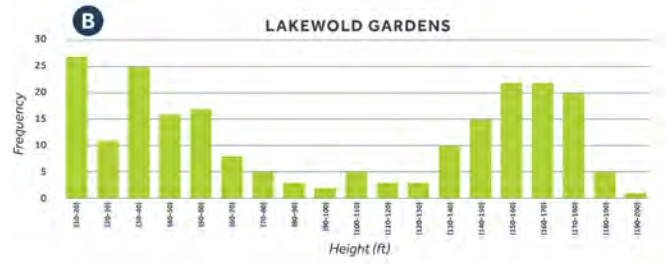
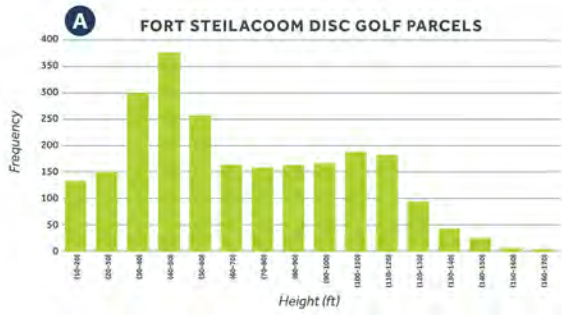


Figure 15. Tree height histogram at seven large acreage sites including (A) Fort Steilacoom Disc Golf Parcels, (B) Lakewold Gardens, (C) Oakbrook Gold Course, (D) Tacoma Golf and Country Club, (E) Western State Hospital, (F) Meadow Park Golf Course, and (G) Camp Murray.

## 4. Tree Inventory Findings

The 2024 Lakewood tree inventory assessed 11,782 individual trees across public rights-of-way (ROWs), parks, and select public institutional grounds. ROWs included arterial and collector streets and all roads within public parks in the City. This section includes a summary of the findings of the tree inventory, with additional details provided in Appendix E. The number of trees inventoried at each site is shown in Table 10. See Appendix D for a map of tree inventory data collection locations.

**Table 10.** Number of trees inventoried at each site or type.

Site Name	Site Type	Count of Trees Inventoried
Public Rights-of-way	ROW	7,940
Active Park	Public Park	20
American Lake Park	Public Park	92
Edgewater Park	Public Park	21
Harry Todd Park	Public Park	463
Kiwanis Park	Public Park	42
Oakbrook Park	Public Park	31
Ponders Park	Public Park	32
Primley Park	Public Park	29
Springbrook Park	Public Park	132
Washington Park	Public Park	31
Utility Administration Office	Utility	1
JBLM North McChord Field	Public Institutional Grounds	3
Pierce College Campus	Public Institutional Grounds	609
Saint Clare Hospital	Public Institutional Grounds	367
Clover Park High School	Public Schools	180
Custer Elementary School	Public Schools	60
Dower Elementary School	Public Schools	147
Dr. Claudia Thomas Middle School	Public Schools	150
Early Learning Sites	Public Schools	60
Hudtloff Middle School	Public Schools	258
Idlewild Elementary school	Public Schools	160
Lake Louise Elementary School	Public Schools	208
Lakes High School	Public Schools	245
Lakeview Hope Elementary School	Public Schools	148
Lochburn Middle School	Public Schools	192
Oakbrook Elementary School	Public Schools	92
Tillicum Elementary School	Public Schools	45
Tyee Park Elementary School	Public Schools	24
<b>Total</b>		<b>11,782</b>

## 4.1 Species Diversity

Lakewood’s inventoried tree population had a species richness of 161 species representing 69 genera. Species diversity in the urban tree population is vital to prevent significant losses due to an unexpected fatal pest or pathogen that moves into the region. The risk of ignoring species diversification can be costly for municipalities. Recommended diversity targets follow the 30-20-10 rule for species diversity (Plant & Kendal 2019). The rule specifies that any one species should be reflected in no more than 10% of the population, a single genus no more than 20%, and an individual tree family represents no more than 30% of the tree population.

The most abundant tree species in Lakewood were Douglas-fir (*Pseudotsuga menziesii*), Oregon white oak (*Quercus garryana*), Norway maple (*Acer platanoides*), cherry plum (*Prunus cerasifera*), and red maple (*Acer rubrum*), which together make up over half of all inventoried trees (54%). Douglas-fir and Oregon white oak, representing 30% and 11% respectively, are the only species that individually compose greater than 10% of the tree population (Figure 16).

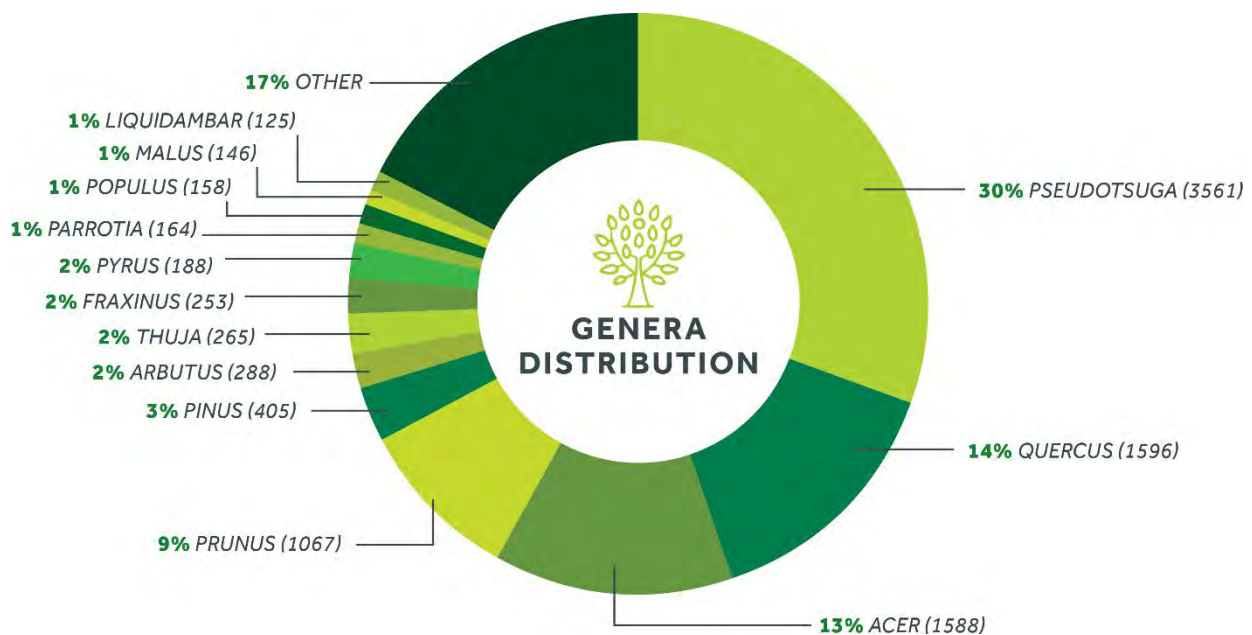


Figure 16. Genera distribution of inventoried trees, rounded to nearest percent.

Of the inventoried trees, 66% are represented by four genera, including *Pseudotsuga*, *Quercus*, *Acer*, and *Prunus* (Figure 16). With 30% of the tree population, *Pseudotsuga* is the only genus that exceeds the 20% species recommendation of the total tree population. Table 11 provides an overview of the top five genera documented during the inventory and the respective species.

In terms of species, Douglas-fir and Oregon white oak are the two species that exceed the 20% diversity recommendation. Although diversified tree populations are thought to be beneficial by increasing ecological resilience and spreading risk of environmental stresses across many different taxa, Douglas-

fir and Oregon white oak are both native species and are highly valued for the ecological functions they provide.

Table 11. Five most abundant genera and respective species.

Genus	Species	Number	Percent of Total
Pseudotsuga (30%)	<i>Pseudotsuga menziesii</i>	3,561	30.2%
Quercus (14%)	<i>Quercus alba</i>	32	0.3%
	<i>Quercus garryana</i>	1,314	11.2%
	<i>Quercus palustris</i>	79	0.7%
	<i>Quercus robur</i>	37	0.3%
	<i>Quercus rubra</i>	134	1.1%
Acer (13%)	<i>Acer circinatum</i>	53	0.5%
	<i>Acer fremanii</i>	65	0.6%
	<i>Acer ginnala</i>	1	<0.1%
	<i>Acer grandidentatum</i>	9	0.1%
	<i>Acer griseum</i>	11	0.1%
	<i>Acer macrophyllum</i>	221	1.9%
	<i>Acer palmatum</i>	114	1.0%
	<i>Acer palmatum</i> 'Bloodgood'	2	<0.1%
	<i>Acer platanoides</i>	603	5.1%
	<i>Acer platanoides</i> 'Crimson King'	70	0.6%
	<i>Acer rubrum</i>	353	3.0%
	<i>Acer saccharinum</i>	51	0.4%
	<i>Acer saccharum</i>	30	0.3%
	<i>Acer sp.</i>	5	<0.1%
Prunus (9%)	<i>Prunus avium</i> <cultivated>	125	1.1%
	<i>Prunus avium</i> <wild>	78	0.7%
	<i>Prunus cerasifera</i>	35	0.3%
	<i>Prunus cerasifera</i> 'thundercloud'	496	4.2%
	<i>Prunus domestica</i>	1	0.0%
	<i>Prunus emarginata</i>	32	0.3%
	<i>Prunus laurocerasus</i>	47	0.4%
	<i>Prunus lusitanica</i>	5	<0.1%
	<i>Prunus persica</i>	3	<0.1%
	<i>Prunus serrulata</i>	183	1.6%
	<i>Prunus sp.</i>	49	0.4%
	<i>Prunus sp.</i> <flowering cherry>	10	0.1%
	<i>Prunus sp.</i> <fruiting cherry>	3	0.0%
Pinus (3%)	<i>Pinus contorta</i>	133	1.1%
	<i>Pinus monticola</i>	19	0.2%
	<i>Pinus nigra</i>	129	1.1%
	<i>Pinus ponderosa</i>	10	0.1%

Genus	Species	Number	Percent of Total
	<i>Pinus sp.</i>	44	0.4%
	<i>Pinus strobus</i>	4	<0.1%
	<i>Pinus sylvestris</i>	65	0.6%
	<i>Pinus thunbergii</i>	1	<0.1%

## 4.2 Tree Characteristics

### 4.2.1 Tree Diameter

The assessed trees had an average diameter of 14.8 inches with a maximum of 89 inches. The population was relatively evenly distributed among size classes (see Figure 17). Older and larger trees greater than 24 inches accounted for 18% of the tree population, most of which were Douglas-fir (11%) and Oregon white oak (4%). The distribution of large trees in the City is geographically variable, with substantial differences between zoning types and census tracts. The residential and open space and recreation land use zones typically had the greatest proportion of large trees, along with the Public Institutional, public ROW, and Neighborhood Commercial 1 (NC1) zones. Summary data for each of these segments is provided in Appendix E.

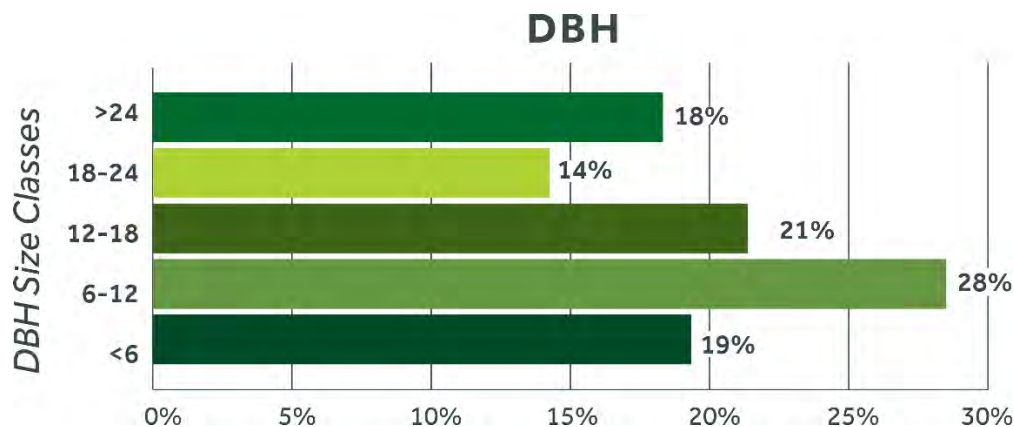


Figure 17. DBH size class distribution of inventoried trees.

### 4.2.2 Inventoried Tree Condition

Most trees surveyed in the inventory were in *good* condition (73%) (Figure 18). This represents a positive sign for the overall health and sustainability of the urban forest. Only 1% of trees were in *Excellent* condition. Trees assessed in *Fair* condition, with low vigor, minor dieback, or significant structural issues, accounted for 21% of the inventory. A *Fair* condition rating was given if reduced vigor and/or defoliation was due to pests or disease as well as those displaying symptoms of drought.

The remaining 4% of trees were categorized as being in a condition of *Poor*, *Very Poor*, or *Dead*, highlighting an important focal point for the City's urban forestry program. Although this represents a small portion of the overall tree population, addressing these trees is essential for maintaining the

long-term health and resilience of the whole urban forest and the opportunity to further enhance the vitality of the urban canopy.

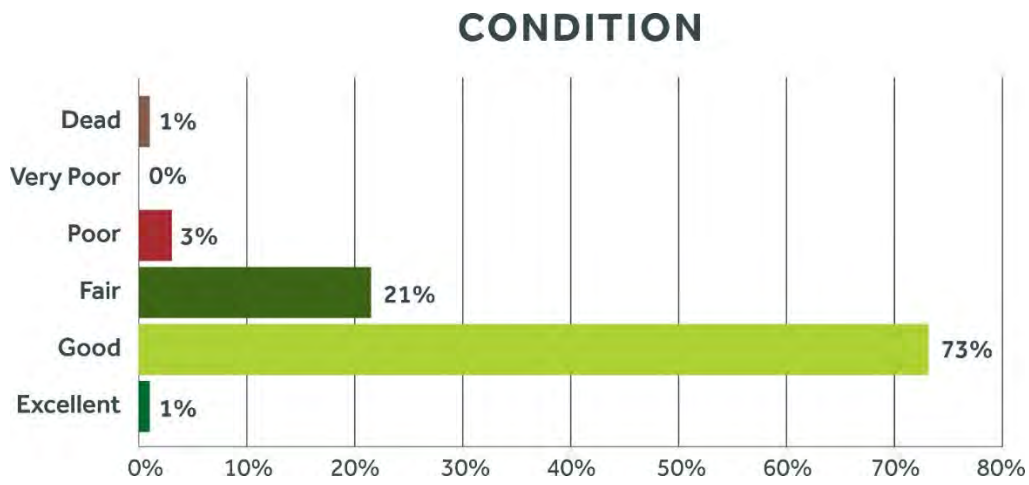


Figure 18. Condition of inventoried trees.

### 4.3 Tree Infrastructure Conflicts

Addressing infrastructure conflicts can lead to improved tree health, structure, and longevity. Most trees assessed during the inventory had been well maintained with few immediate pruning needs required to address canopy-related infrastructure conflicts. Most of the assessed trees are located in unrestricted landscaped areas (42%), unimproved rights-of-way (26%), or planter beds (29%). This distribution emphasizes the importance of these types of green infrastructure to support the urban forest canopy. The remaining 3% of trees were located in medians (1%) and tree wells (1%).

Facet arborists observed infrastructure conflicts in only 3% of Lakewood's trees. These include sidewalk uplift (0.8%), street uplift (0.3%), and root girdling (0.2%). The majority of tree conflicts are categorized as "other," which can include conflicts such as trees previously topped below power lines. While the proportion of infrastructure conflicts is relatively low, addressing these is essential to minimize long-term damage to infrastructure. One reason for the low infrastructure conflict result is that Lakewood is a young city; as it continues to perform needed and required work to construct public infrastructure appropriate for a city environment (i.e., sidewalks and other non-motorized transportation systems), the reality of removing trees in order to do so will affect the current tree canopy.

# 5. Forest Landscape Assessment Tool (FLAT)

## 5.1 Tree-iage Categorization

The City of Lakewood’s undeveloped natural areas range from pristine forests to prairies to areas dominated by invasive plant species. The distribution of these conditions is summarized in Figure 19, which provides the number of natural area acres within each Tree-iage category. Although each of the four sites assessed (Fort Steilacoom Park, Seeley Lake Park, Wards Lake Park, and the South Puget Sound Wildlife Area) are managed by a different landowner (e.g., city, county, and state agencies), the overall results are presented in the aggregate. Site-specific summaries are provided in Table 12 below and site-specific FLAT maps are found in Appendix G.

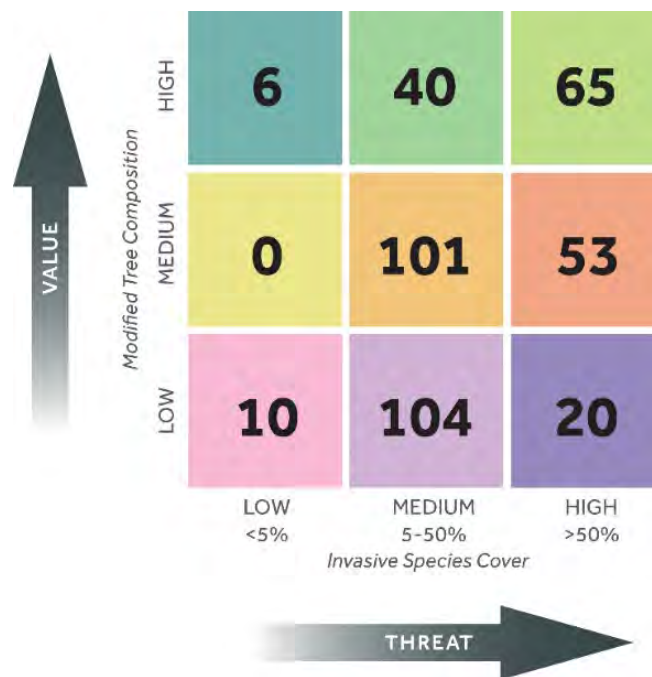


Figure 19. Total acreage for each Tree-iage category.

Of the inventoried natural areas, 28% were assessed to have an overstory composition well suited for the site and ecoregion, as represented by Categories 1-3 (See Chapter 2.4, Table 6 for a description of each tree-iage category). These include natural areas with an abundance of conifers, Pacific madrones, Oregon white oak, and wetlands that have water regimes that would not support a forested ecosystem. Only 1% of natural areas were in Category 1, which is characterized as having both the highest-ranking canopy composition and the lowest amount of invasive species coverage.

Medium-scoring habitat management units (HMUs) in Categories 5-6 represented 39% of the inventoried natural areas. These generally represented forested HMUs with a relatively high proportion of deciduous or non-native canopy species and moderate-to-high cover of invasive species. They also included areas of oak prairie ecosystems in which additional tree recovery is an objective of management plans. No HMUs were inventoried as Category 4.



Category 7-9 HMUs represent 34% of the natural area acreage had degraded or entirely deciduous forest canopies. These included areas of forest that had no conifers, madrones, native oaks, or non-forested natural areas capable of supporting forests. These HMU's also included open fields that could be restored to a forested condition. The majority of these HMUs had moderate levels of invasive species cover.

Table 12. Tree-age acres per site

Site Name	Acres by Tree-age Value									Total
	1	2	3	4	5	6	7	8	9	
Fort Steilacoom Park	0.0	0.0	54.1	0.0	33.8	20.8	10.2	104.2	20.1	243.3
Seely Lake Park	0.0	25.8	0.0	0.0	0.0	20.4	0.0	0.0	0.0	46.3
Wards Lake Park	0.0	11.2	10.5	0.0	0.0	12.3	0.0	0.0	0.0	34.0
South Puget Sound Wildlife Area	5.6	2.8	0.0	0.0	66.7	0.0	0.0	0.0	0.0	75.1

Invasive species were prevalent across the City, with 35% of natural areas having over 50% invasive species (see Figure 21). Additionally, 61% of open spaces had an invasive species cover between 5-50%. Only 4% of natural areas had less than 5% invasive species cover.

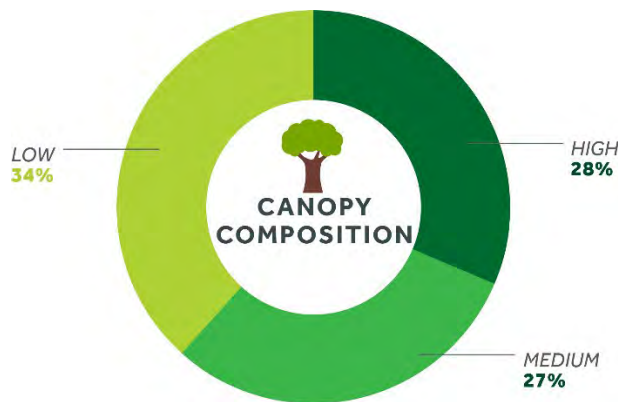


Figure 20. Canopy composition, area-weighted.

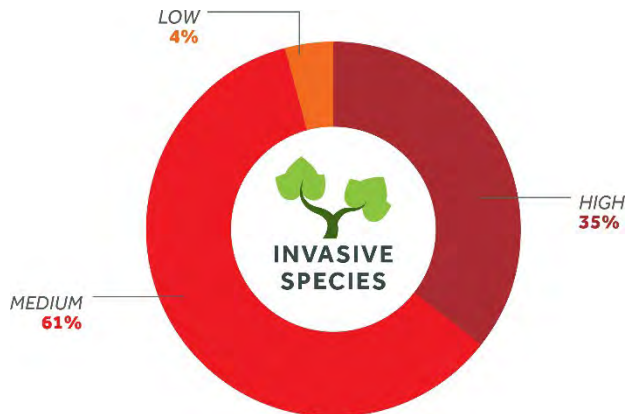


Figure 21. Invasive species cover, area-weighted.

## 5.2 Overstory Species Composition

Overstory species are categorized in each HMU by whether they are the most abundant, second most abundant, or third most abundant species. Douglas-fir is the most abundant species growing in Lakewood natural areas, followed by Oregon white oak and black cottonwood. Bigleaf maple, Oregon ash, black poplar, black locust, and Sitka willow are also listed as the most abundant trees in many HMUs, cumulatively 45% of all HMUs by area.

Since forests in this region were historically coniferous or oak woodlands, the assessment found a common but significant compositional shift toward early-seral deciduous and other introduced species. Such ecological shifts in urban forests underscore a need for restoration and management to improve degraded conditions where possible.

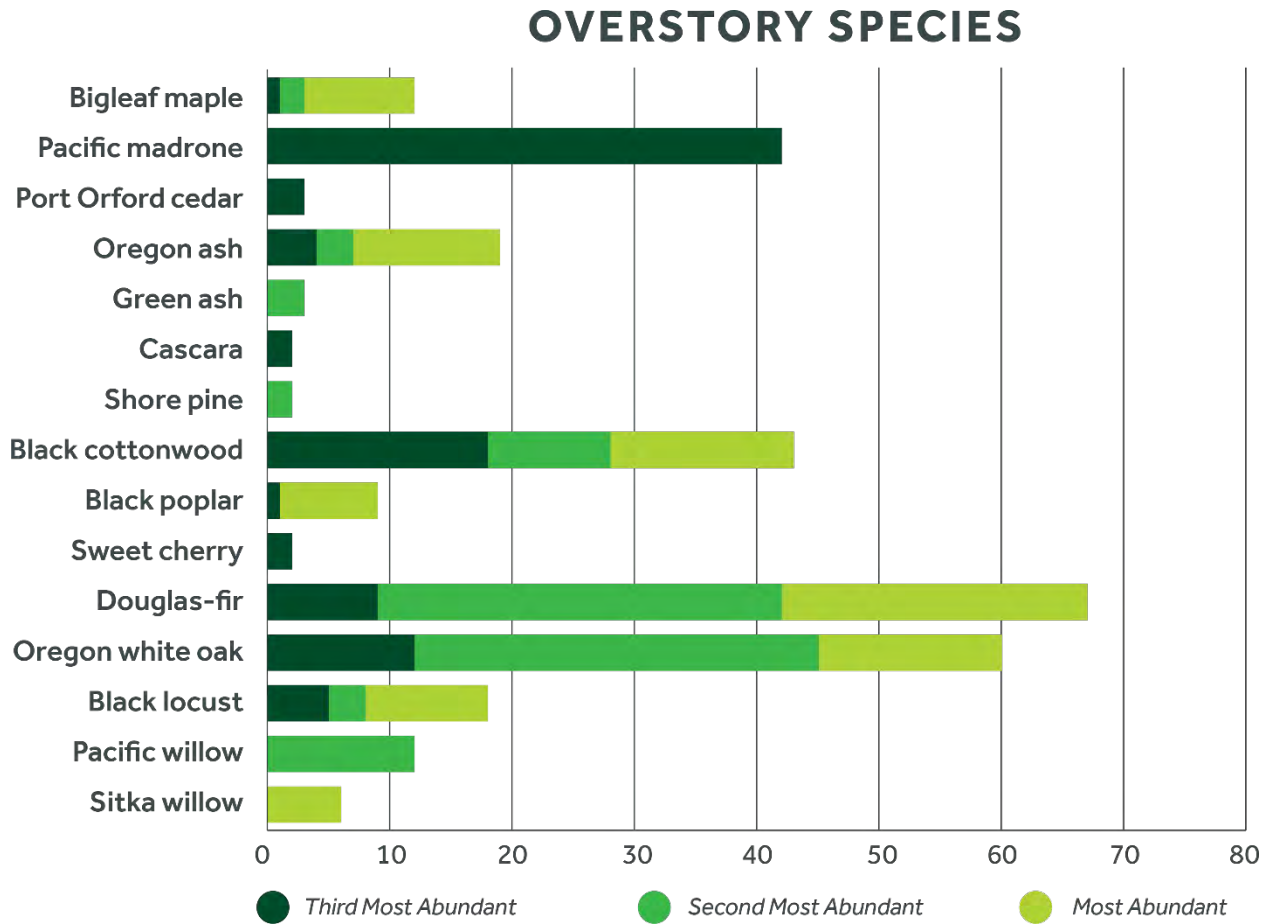


Figure 22. First, second, and third most abundant tree species per HMU-acre, area-weighted.

### 5.2.1 Regeneration Species

Tree regeneration was a concern for most HMUs, with 86% having a density of between 0-49 trees per acre (TPA), the lowest category. Of the 14% of sites with moderate regeneration (between 50-149 TPA) and abundant regeneration (>150 TPA), the sapling tree composition was primarily bigleaf maple and Oregon white oak. There were also significant amounts of Pacific madrone, Oregon ash, black cottonwood, Pacific willow, and western redcedar (Figure 23). Regeneration of introduced species was also observed and was not counted toward these metrics.

The relatively low levels of tree regeneration present in the assessed forests provided an indicator that management may be necessary to achieve the City's desired outcomes. Adding to the resilience of a

forest, regeneration trees provide for a new generation of forest canopy trees following eventual disturbance events.

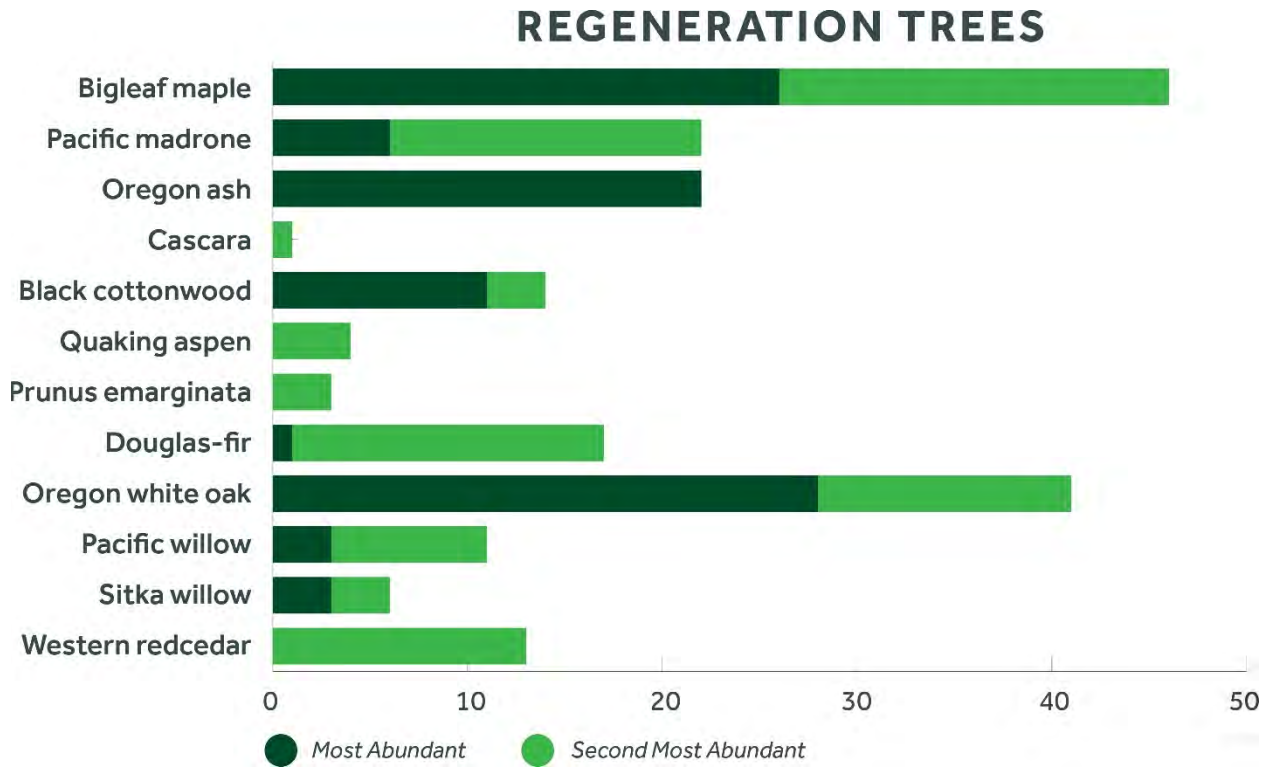


Figure 23. First and second most abundant regeneration tree species per HMU-acre, area-weighted.

## 5.2.2 Understory Species

The forest understory in the assessed HMUs was composed of a mix of native and invasive species. The most and second most abundant native plant species are shown in Figure 24. These are primarily common understory species that are well suited to the ecoregion, especially sword fern, osoberry, tall Oregon grape, and beaked hazelnut. Douglas spirea, cattail, red-osier dogwood, and swamp smartweed are particularly abundant in sites with large areas of wetlands.

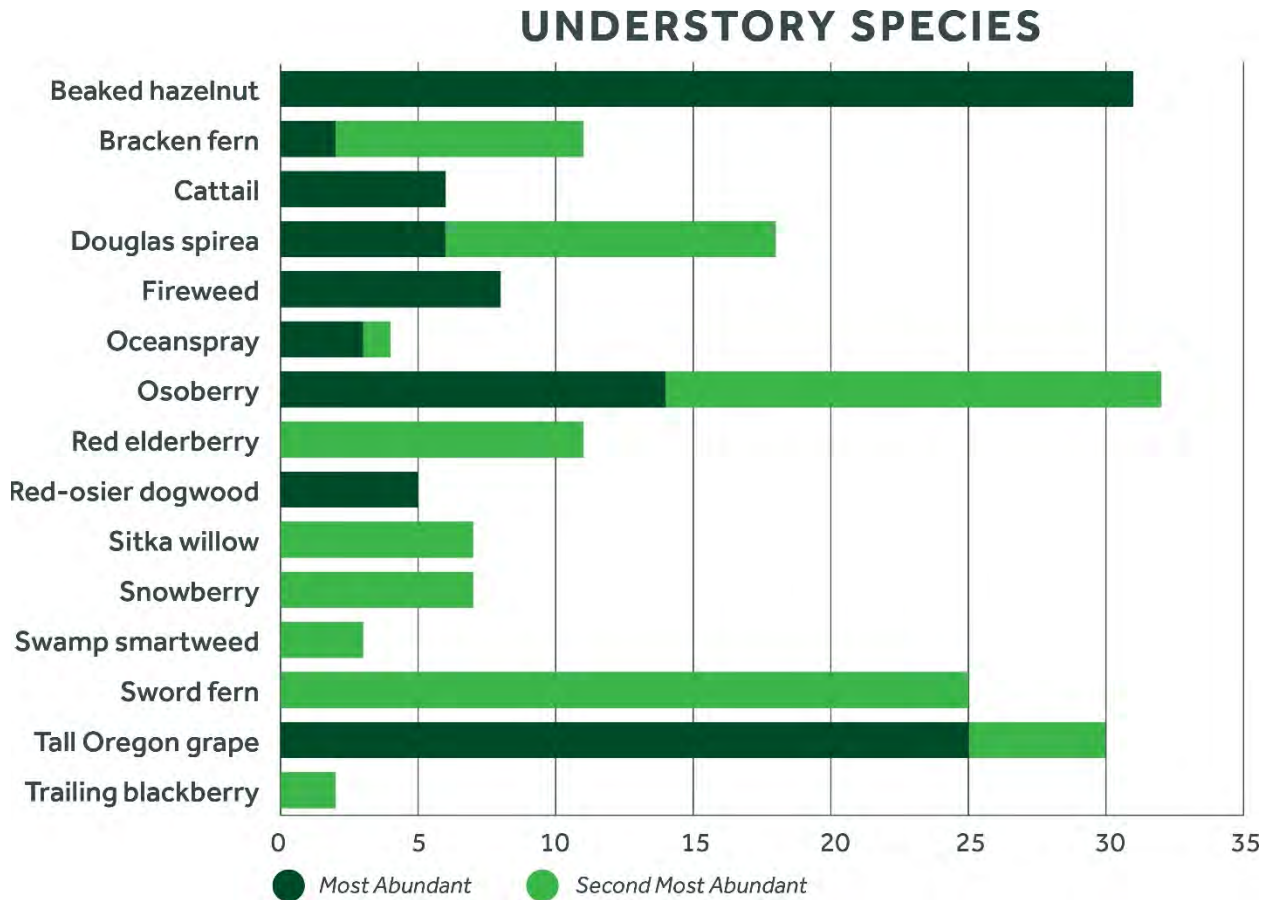


Figure 24. First and second most abundant understory species, area-weighted.

### 5.2.3 Invasive Species

Invasive plant species pose a significant and unique challenge in urban forest and natural area management and are labor-intensive and costly to control. Himalayan blackberry and English ivy are among the most abundant invasive plant species and pose significant threats to forests. Scotch broom, in addition to Himalayan blackberry, is particularly abundant in grasslands and shrublands. Lakewood’s most, second most, and third most abundant invasive species presented in each HMU are shown in Figure 25.

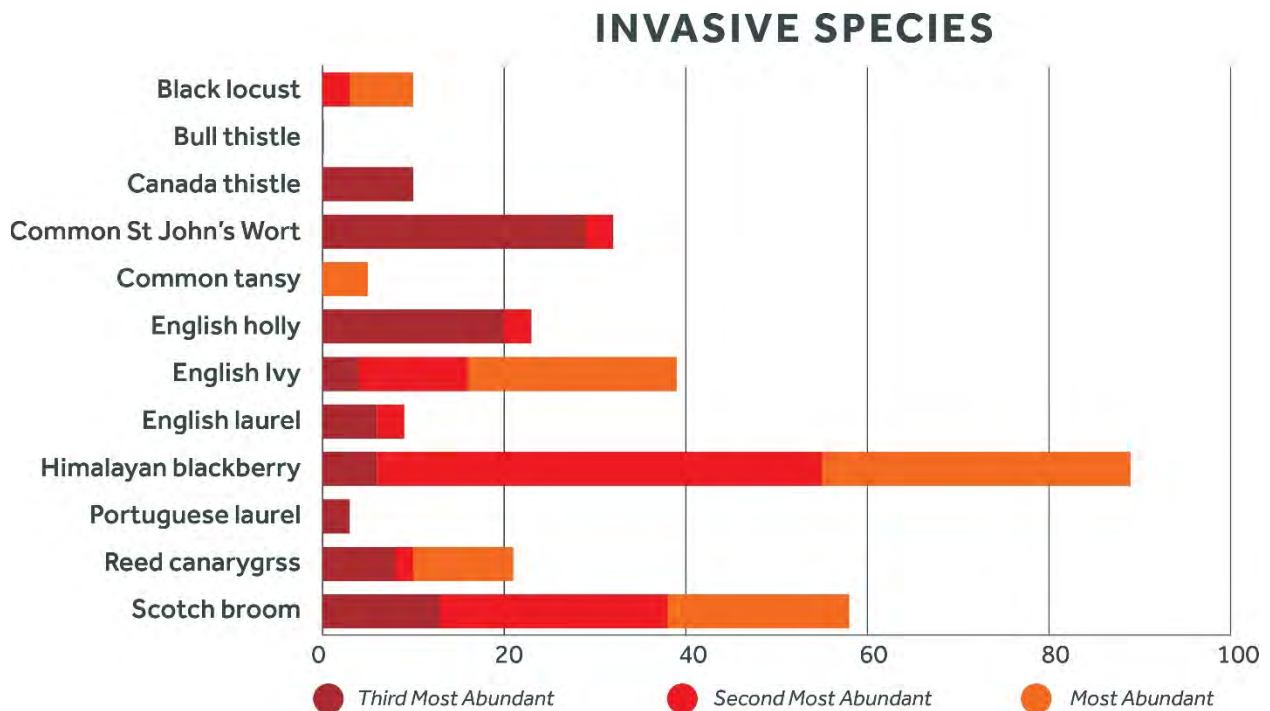


Figure 25. First, second, and third most abundant invasive species, area-weighted.

### 5.3 Stewardship Recommendations

The results of the FLAT inventory provide an overview of the ecological conditions of the four natural area parks based on canopy conditions and levels of invasive species cover. The stewardship strategies outlined in Table 13 are based on the FLAT data and Tree-iage categories, as well as industry best practices and on-the-ground experience of restoration professionals within the Puget Sound region. This UFAR is not intended to serve as a site-level stewardship plan, but rather a high-level summary of management approaches based on the tree-iage model.

The focus of these management approaches is the protection of existing desired overstory vegetation and the management of invasive species. Urban forests are particularly vulnerable to invasive species due to the amount of habitat fragmentation, edges, and open areas that are well suited to invasive plant introduction and colonization. Invasive plants disrupt native forests by outcompeting native understory vegetation and suppressing native tree seedlings' establishment. Without new trees to regenerate after forest disturbance, invasive trees and shrubs may eventually displace native forests.

Table 13. Management Approach per Tree-iage Category

Category	Management Approach
<p><b>Category 1</b> Long-term Monitoring and Maintenance</p>	<p>Category 1 HMUs should be enrolled in a regular long-term maintenance and monitoring schedule to ensure invasive species do not re-establish significant populations on these sites or reach thresholds where invasive pressure causes loss of native understory or regenerating native canopy trees. Long-term monitoring should consist of “sweeps” through Category 1 HMUs at years 5, 10, and 20 post-enrollment of the site into active management.</p>
<p><b>Category 2</b> Invasive Plant Removal and Monitoring</p>	<p>Management is recommended to focus on more intensive invasive plant removal with additional years of follow-up removal. Initial clearing of invasive plants can be done through a combination of manual removal techniques and herbicide applications. In areas with medium invasive cover or species that are challenging to control, initial invasive removal may require more than one year of continued invasive removal maintenance.</p>
<p><b>Category 3</b> Intensive Invasive Plant Removal</p>	<p>With invasive plant cover greater than 50% and a high-value canopy, intensive invasive plant removal will be the priority for these HMUs. Due to the high level of invasive cover in the understory, invasive removal will result in significant bare ground and may require slope stabilization measures and/or mulch applications to protect exposed soils and suppress additional weed growth. Infill planting of native understory in addition to canopy tree seedlings will be needed.</p>
<p><b>Category 4</b> Planting, Maintenance, and Monitoring</p>	<p>Canopies with medium habitat composition scores that have at least 25% native canopy cover. Efforts will focus on controlling the low percentage of invasive species present. These HMUs can then be enrolled in long-term maintenance and monitoring to ensure invasive species do not re-establish on these sites or reach thresholds where they outcompete native understory plants.</p>

Category	Management Approach
<p><b>Category 5</b> Invasive Plant Removal and Planting</p>	<p>Category 5 HMUs will require intensive invasive plant removal similar to Category 2. Initial clearing of invasive plants can be done through a combination of manual removal techniques and herbicide applications. In areas with medium invasive cover or species that are challenging to control, initial invasive removal may require more than one year of initial removal. Native tree installation should be prioritized in these areas since these sites have less than 50% canopy cover.</p>
<p><b>Category 6</b> Intensive Invasive Plant Removal and Planting</p>	<p>With invasive plant cover greater than 50% and a medium-value canopy – intensive invasive plant removal will be the priority for these HMUs along with infill planting. Due to the high level of invasive cover in the understory, invasive removal will result in significant bare ground and may require slope stabilization measures and/or mulch applications to protect exposed soils and suppress additional weed growth. Infill planting of canopy species will be the priority coupled with native understory species.</p>
<p><b>Category 7</b> Site Assessment, Intensive Planting, and Long-term Monitoring</p>	<p>Given the low-quality canopy, yet low invasive threat on these sites, additional site assessment is recommended to determine the limiting factors to successful canopy establishment prior to any additional planting. It will be important to determine if issues such as historic site disturbance, soil conditions, or hydrology are impacting canopy establishment and retention.</p>
<p><b>Category 8</b> Invasive Plant Removal and Intensive Planting</p>	<p>Category 8 HMUs will require a large investment of time and resources and will be prioritized as funding becomes available. Since these acres are resource-heavy, land managers will focus efforts on managing Pierce County-regulated noxious weeds, addressing safety issues from hazardous trees, creating ivy rings as an emergency stop-gap measure to protect existing canopy, or supporting community-driven stewardship efforts. Category 8 sites will require invasive removal as well as robust planting to re-establish a sustainable assemblage of native plants and/or tree canopy.</p>
<p><b>Category 9</b> Intensive Invasive Plant Removal and Intensive Planting</p>	<p>Category 9 HMUs are the most heavily degraded and as such will require the greatest number of resources. These sites will be the lowest priority for forest or natural area management efforts but are unlikely to further degrade in the near term. Land managers should focus efforts on managing Pierce County-regulated noxious weeds, addressing safety issues from hazard trees, creating ivy rings as an emergency stop-gap measure to protect existing canopy, or supporting community-driven stewardship efforts.</p>

## 6. Public Tree Management

The practice of urban forest management is the implementation of policies, procedures, and protocols for tree planting, tree care and maintenance, and tree removal and replacement to support a healthy and sustained tree canopy. By using data about Lakewood's existing urban forest conditions to inform decisions regarding infrastructure development, land use management, and partnerships with utilities, agencies, and the public, the City ensures the work is done in support of the city's adopted urban forest and tree canopy goals.

This UFAR provides an assessment of the city's urban and community forest and is an important foundational component of the overall urban forestry management planning effort. However, it does not serve as a public tree management plan or program. The following section aims to provide information for the City's consideration regarding maintenance and management of public tree resources.

### 6.1 Tree Inventory Maintenance Recommendations

Below are recommendations about tree pruning needs and resolving conflicts between trees and infrastructure. The GIS data, which includes spatial information and arborist notes, provides detailed information on tree maintenance recommendations.

A proactive and structured municipal street tree maintenance program is essential to ensure the health, safety, and longevity of Lakewood's urban forest. Routine inspections should identify and address issues such as pests, diseases, and structural weaknesses early to minimize risks and costs. Regular maintenance should also be implemented to promote overall tree health and manage potential hazards. These may be prioritized in locations with high traffic, pedestrian use, or areas with potential conflicts with utilities and infrastructure.

Maintenance needs were identified for roughly 21% of the inventoried trees. Although this is a minority of the canopy, they represent a substantial workload considering the overall size of the City's urban forest canopy and will require the City to plan the use of its financial and human resources strategically. A list of tree maintenance recommendations is provided in Tables 14, 15, and 16. Lakewood's most abundant tree species were also the species identified as requiring the most maintenance.

Certain species have particularly high rates of maintenance needs; these include certain pines, magnolias, elms, English oak, European hornbeam, green ash, little leaf linden, white oak, Pacific yew, and Siberian elm. The inventory identified that 60-85% of the trees represented by these species are recommended for maintenance actions.

Although some species are known to require greater levels of care, the sample size was small for some individual species. Additionally, tree species may also be planted in groups within certain geographic locations in clusters of similar age and environmental conditions; such non-randomized sampling may not be representative of the entire population. This information should not be used to preclude the further planting of these species without evaluating their suitability for the Lakewood environment.



**Table 14.** Recommended tree maintenance for right-of-way trees.

Maintenance Type	Number of Trees	Notes
Raise canopy & clearance prune	483	Prune to clear ROW over sidewalks or roads.
Remove deadwood	258	Remove dead limbs.
Remove tree	154	Trees may be dead or in critical condition.
Training prune	56	Young trees need pruning to improve structure and future growth.
Side trim	25	Prune to clear ROW for sidewalks or roads.
Thin canopy	69	Prune to thin interior and competing limbs.
Grind stump	18	Grind stump of a previously removed tree.
Other	514	New trees needing stakes removed or other recommendations with details included in the notes.

**Table 15.** Recommended tree maintenance for city-managed parks.

Maintenance Type	Number of Trees	Notes
Raise canopy & clearance prune	14	Prune to clear ROW over sidewalks or roads.
Remove deadwood	109	Remove dead limbs.
Remove tree	34	Trees may be dead or in critical condition.
Training prune	0	Young trees need pruning to improve structure and future growth.
Side trim	0	Prune to clear ROW for sidewalks or roads.
Thin canopy	0	Prune to thin interior and competing limbs.
Grind stump	4	Grind stump of a previously removed tree.
Other	68	New trees needing stakes removed or other recommendations with details included in the notes.

**Table 16.** Recommended tree maintenance for public institutional grounds.\*

Maintenance Type	Number of Trees	Notes
Raise canopy & clearance prune	30	Prune to clear ROW over sidewalks or roads.
Remove deadwood	235	Remove dead limbs.
Remove tree	51	Trees may be dead or in critical condition.
Training prune	0	Young trees need pruning to improve structure and future growth.
Side trim	2	Prune to clear ROW for sidewalks or roads.
Thin canopy	4	Prune to thin interior and competing limbs.
Grind stump	0	Grind stump of a previously removed tree.
Other	65	New trees needing stakes removed or other recommendations with details included in the notes.

\*Sites represented in this table include Clover Lake School District and other public institutions not managed by Lakewood Public Works.

## 6.2 Public Tree Asset Management

The following text is selectively excerpted and edited from a Technical Memorandum provided by Facet to the City of Lakewood on November 20, 2024. The memorandum summarized a work session held by the Facet and City project team that identified the City's data management objectives, assessed current staffing capacity, examined budget considerations, and identified available asset management tools. See Appendix H for the complete memorandum.

*"Within the urban forest, public trees function as green infrastructure assets that provide a wide range of community benefits. Yet unlike most infrastructure assets, the value of trees appreciates over time. This is further justification to measure and proactively manage public trees for optimal condition and longevity, and to minimize risk to property and people.*

*Many jurisdictions integrate their public individual tree data directly into a maintenance management system (MMS) such as Hansen, Cityworks, or PubWorks, developed to manage infrastructure assets such as light posts, fire hydrants, or sidewalks. However, unlike static assets, trees are dynamic biological organisms with attributes that change over time, such as health and condition, trunk diameter, and canopy spread. The maintenance status and needs of the tree are also tracked within the MMS and may include specific maintenance tasks such as clearance pruning, planting needed, stump removal, and removal of the tree. Some tree management software programs have been specifically designed to efficiently record and track these changes with other features, such as distributing workloads and strategically prioritizing tree pruning, removal, inspections, and other activities to meet certain management objectives. Many tree software systems interface with ESRI/GIS maps and can integrate with existing municipal maintenance management systems like Cityworks, customer service systems such as 311, and even social media platforms."*

The 2024 Lakewood urban forest assessment is a critical first phase in the development of the City's urban forestry program and the shift from a reactive to a more proactive form of tree management. In concert with the information gathered during the tree asset management consultation and work session, the results of this urban forest assessment can be used to inform the City's financial and other resource planning to implement its urban forestry and canopy cover goals in 2025 and beyond.

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## APPENDIX A. Census Block Group Data

Census Tract and Block Group	Mean HH Income	Tree Equity	Land Area		Urban Tree Canopy			Plantable Area		
			Acres	A%	Acres	A%	UTC%	Acres	A%	PA%
071703 Block Group 1	54,828	65	6.9	0.1%	0.6	7.9%	0.0%	6.9	50.3%	0.1%
071704 Block Group 1	41,012	63	120.1	1.1%	7.6	6.3%	0.3%	120.1	17.2%	1.1%
071706 Block Group 1	50,403	71	157.9	1.4%	9.6	6.1%	0.4%	157.9	16.4%	1.4%
071803 Block Group 1	136,548	78	466.9	4.3%	94.9	20.3%	3.6%	466.9	47.2%	4.3%
071803 Block Group 2	59,539	76	334.0	3.1%	35.8	10.7%	1.3%	334.0	37.4%	3.1%
071803 Block Group 3	57,803	87	72.6	0.7%	21.3	29.4%	0.8%	72.6	29.2%	0.7%
071803 Block Group 4	95,625	91	71.8	0.7%	14.4	20.1%	0.5%	71.8	23.8%	0.7%
071805 Block Group 1	68,024	68	82.5	0.8%	6.6	8.1%	0.2%	82.5	22.5%	0.8%
071805 Block Group 2	72,078	68	103.6	0.9%	9.0	8.7%	0.3%	103.6	34.1%	0.9%
071805 Block Group 3	50,789	69	147.2	1.3%	15.6	10.6%	0.6%	147.2	20.0%	1.3%
071806 Block Group 1	51,429	67	214.8	2.0%	29.8	13.9%	1.1%	214.8	21.6%	2.0%
071806 Block Group 2	75,177	74	204.4	1.9%	41.8	20.4%	1.6%	204.4	40.1%	1.9%
071807 Block Group 1	62,586	100	617.8	5.7%	74.4	12.1%	2.8%	617.8	14.3%	5.7%
071807 Block Group 2	64,063	80	429.6	3.9%	50.9	11.8%	1.9%	429.6	22.1%	3.9%
071808 Block Group 1	63,998	80	116.5	1.1%	15.8	13.6%	0.6%	116.5	20.9%	1.1%
071808 Block Group 2	70,592	77	263.7	2.4%	62.4	23.7%	2.3%	263.7	25.7%	2.4%
071808 Block Group 3	38,551	77	92.2	0.8%	12.2	13.2%	0.5%	92.2	22.9%	0.8%
071901 Block Group 1	68,399	76	423.1	3.9%	58.9	13.9%	2.2%	423.1	18.9%	3.9%
071901 Block Group 2	48,719	80	126.4	1.2%	17.1	13.5%	0.6%	126.4	31.7%	1.2%
071901 Block Group 3	103,269	90	195.9	1.8%	30.7	15.7%	1.2%	195.9	41.8%	1.8%
071901 Block Group 4	n/a	n/a	280.5	2.6%	97.5	34.8%	3.7%	280.5	32.3%	2.6%
071902 Block Group 1	100,043	86	208.1	1.9%	59.4	28.5%	2.2%	208.1	30.5%	1.9%
071902 Block Group 2	86,458	91	144.7	1.3%	42.8	29.6%	1.6%	144.7	28.7%	1.3%
071902 Block Group 3	n/a	100	231.1	2.1%	90.2	39.0%	3.4%	231.1	25.2%	2.1%
071902 Block Group 4	250,000+	95	239.1	2.2%	113.0	47.3%	4.3%	239.1	28.8%	2.2%
071902 Block Group 5	n/a	n/a	691.1	6.3%	262.9	38.0%	9.9%	691.1	38.0%	6.3%
072000 Block Group 1	46,566	64	177.5	1.6%	24.8	14.0%	0.9%	177.5	25.7%	1.6%
072000 Block Group 2	42,277	76	168.1	1.5%	35.7	21.2%	1.3%	168.1	30.3%	1.5%
072000 Block Group 3	64,457	82	209.9	1.9%	53.1	25.3%	2.0%	209.9	24.8%	1.9%
072000 Block Group 4	n/a	n/a	106.1	1.0%	23.1	21.8%	0.9%	106.1	26.8%	1.0%
072105 Block Group 1	151,094	88	130.9	1.2%	25.8	19.7%	1.0%	130.9	29.0%	1.2%
072105 Block Group 2	118,289	90	378.7	3.5%	110.2	29.1%	4.1%	378.7	41.2%	3.5%
072105 Block Group 3	128,068	93	213.6	2.0%	55.0	25.7%	2.1%	213.6	41.3%	2.0%
072105 Block Group 4	69,776	96	337.5	3.1%	153.9	45.6%	5.8%	337.5	30.2%	3.1%
072106 Block Group 1	92,500	100	203.1	1.9%	83.5	41.1%	3.1%	203.1	22.9%	1.9%
072106 Block Group 2	84,667	86	349.6	3.2%	126.9	36.3%	4.8%	349.6	38.4%	3.2%
072106 Block Group 3	39,176	81	211.4	1.9%	38.3	18.1%	1.4%	211.4	28.2%	1.9%
072106 Block Group 4	56,964	87	75.4	0.7%	11.4	15.1%	0.4%	75.4	20.7%	0.7%
072107 Block Group 1	99,078	91	149.8	1.4%	31.0	20.7%	1.2%	149.8	34.7%	1.4%
072107 Block Group 2	124,219	95	282.2	2.6%	105.3	37.3%	4.0%	282.2	32.0%	2.6%
072107 Block Group 3	98,083	88	150.3	1.4%	53.1	35.3%	2.0%	150.3	30.7%	1.4%
072107 Block Group 4	n/a	n/a	593.7	5.4%	150.2	25.3%	5.7%	593.7	54.9%	5.4%
072108 Block Group 1	83,750	92	259.4	2.4%	95.7	36.9%	3.6%	259.4	32.0%	2.4%
072108 Block Group 2	97,232	81	133.1	1.2%	27.1	20.4%	1.0%	133.1	33.1%	1.2%
072108 Block Group 3	89,794	84	122.0	1.1%	36.6	30.0%	1.4%	122.0	31.6%	1.1%
072108 Block Group 4	85,540	86	148.1	1.4%	37.2	25.1%	1.4%	148.1	29.1%	1.4%

Census Tract and Block Group	Mean HH Income	Tree Equity	Land Area		Urban Tree Canopy			Plantable Area		
			Acres	A%	Acres	A%	UTC%	Acres	A%	PA%
072108 Block Group 5	n/a	n/a	132.2	1.2%	32.8	24.8%	1.2%	132.2	32.6%	1.2%
072109 Block Group 2	81,111	88	1.2	0.0%	0.1	7.7%	0.0%	1.2	21.0%	0.0%
072112 Block Group 1	94,875	86	159.8	1.5%	28.9	18.1%	1.1%	159.8	28.8%	1.5%
072112 Block Group 2	142,095	84	25.8	0.2%	4.0	15.5%	0.2%	25.8	43.2%	0.2%
072112 Block Group 3	75,735	85	140.2	1.3%	35.9	25.6%	1.4%	140.2	35.3%	1.3%
072308 Block Group 4	n/a	n/a	7.2	0.1%	3.3	46.2%	0.1%	7.2	27.3%	0.1%
072312 Block Group 1	105,273	92	0.7	0.0%	0.6	80.5%	0.0%	0.7	9.1%	0.0%
<b>Totals</b>			<b>10910.1</b>	<b>100%</b>	<b>2658.9</b>	<b>24.4%</b>	<b>100%</b>	<b>10910.1</b>	<b>31.4%</b>	<b>100%</b>

*A%: Percent land, urban forest canopy area, or plantable area within each census block group.*

*UTC%: Percent urban forest canopy cover relative to the City total.*

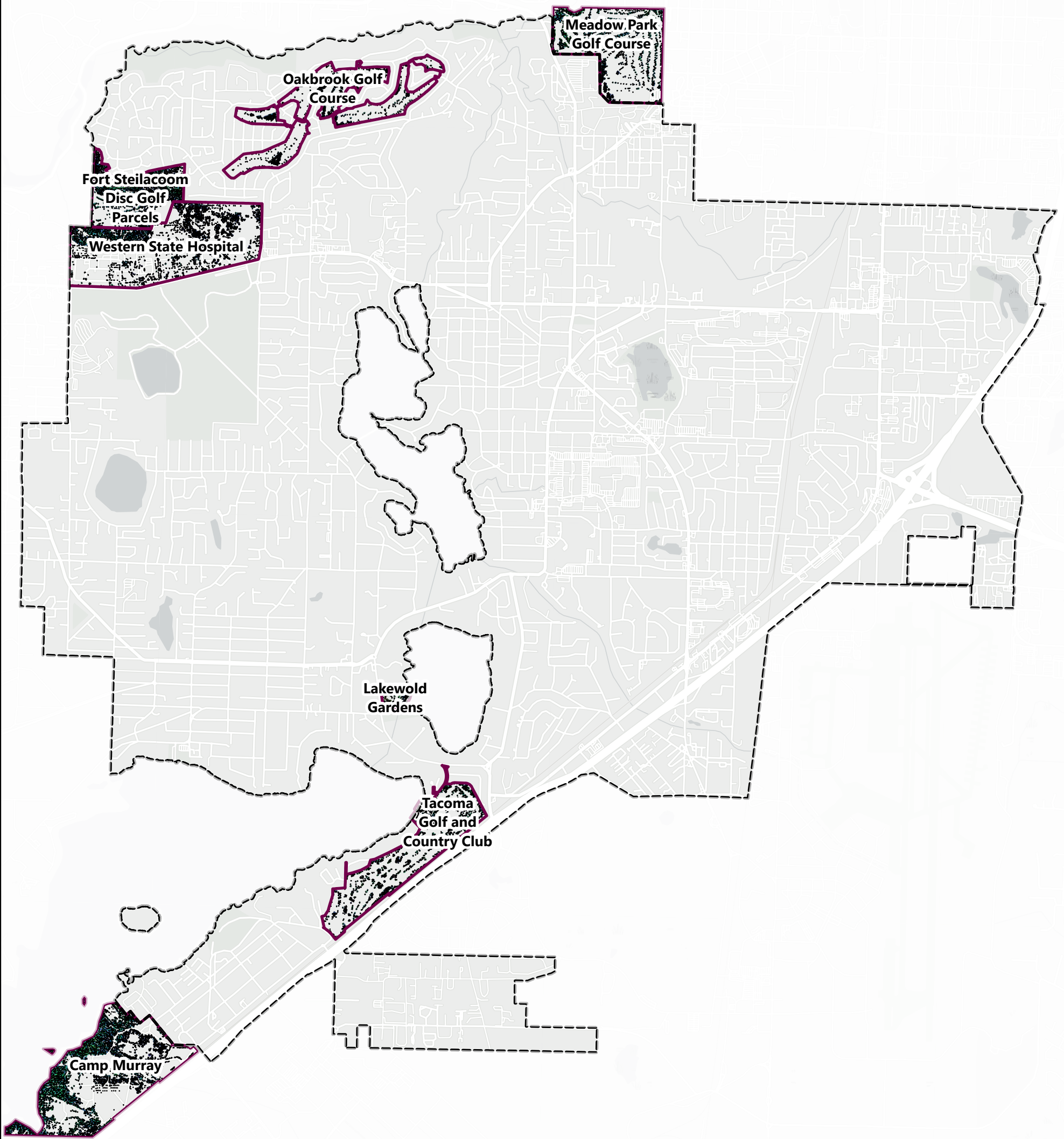
*PA%: Percent plantable area relative to the City total.*

*Tree Equity: Scores provided by American Forests, obtained December 2024.*

## APPENDIX B. Canopy Height Model Results for Census Block Groups with <35% UTC




Census Block Group	GEOID	Area (ac)	Canopy Cover (%)	Tree Count
071703 Block Group 1	530530717031	6.9	7.90%	62
071704 Block Group 1	530530717041	120.1	6.30%	695
071706 Block Group 1	530530717061	157.9	6.10%	1,003
071803 Block Group 1	530530718031	466.9	20.30%	7,302
071803 Block Group 2	530530718032	334	10.70%	3,587
071803 Block Group 3	530530718033	72.6	29.40%	1,699
071803 Block Group 4	530530718034	71.8	20.10%	1,036
071805 Block Group 1	530530718051	82.5	8.10%	637
071805 Block Group 2	530530718052	103.6	8.70%	814
071805 Block Group 3	530530718053	147.2	10.60%	1,405
071806 Block Group 1	530530718061	214.8	13.90%	1,994
071806 Block Group 2	530530718062	204.4	20.40%	3,125
071807 Block Group 1	530530718071	617.8	12.10%	7,284
071807 Block Group 2	530530718072	429.6	11.80%	4,314
071808 Block Group 1	530530718081	116.5	13.60%	1,280
071808 Block Group 2	530530718082	263.7	23.70%	4,295
071808 Block Group 3	530530718083	92.2	13.20%	1,046
071901 Block Group 1	530530719011	423.1	13.90%	5,513
071901 Block Group 2	530530719012	126.4	13.50%	1,429
071901 Block Group 3	530530719013	195.9	15.70%	2,535
071901 Block Group 4	530530719014	280.5	34.80%	5,385
071902 Block Group 1	530530719021	208.1	28.50%	3,964
071902 Block Group 2	530530719022	144.7	29.60%	2,836
072000 Block Group 1	530530720001	177.5	14.00%	1,891
072000 Block Group 2	530530720002	168.1	21.20%	2,276
072000 Block Group 3	530530720003	209.9	25.30%	3,580
072000 Block Group 4	530530720004	106.1	21.80%	1,870
072105 Block Group 1	530530721051	130.9	19.70%	2,194
072105 Block Group 2	530530721052	378.7	29.10%	7,459
072105 Block Group 3	530530721053	213.6	25.70%	4,116
072106 Block Group 3	530530721063	211.4	18.10%	3,024
072106 Block Group 4	530530721064	75.4	15.10%	1,039
072107 Block Group 1	530530721071	149.8	20.70%	2,165
072107 Block Group 4	530530721074	593.7	25.30%	10,006
072108 Block Group 2	530530721082	133.1	20.40%	1,938
072108 Block Group 3	530530721083	122	30.00%	2,320
072108 Block Group 4	530530721084	148.1	25.10%	2,479
072108 Block Group 5	530530721085	132.2	24.80%	2,089
072109 Block Group 2	530530721092	1.2	7.70%	18
072112 Block Group 1	530530721121	159.8	18.10%	1,889
072112 Block Group 2	530530721122	25.8	15.50%	290
072112 Block Group 3	530530721123	140.2	25.60%	2,183
<b>Total</b>		<b>8158.9</b>	<b>19.2%</b>	<b>116,066</b>

## LAKWOOD CHM - OVERVIEW

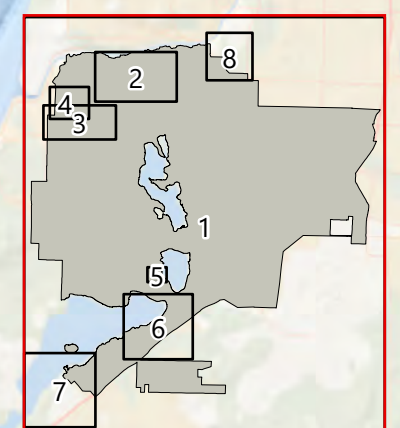
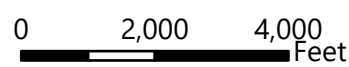
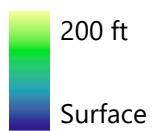


## LAKWOOD APPENDIX MAPS

LAYERS

-  City Boundary
-  Site Boundary
-  Tree Canopy Tops

Canopy Height

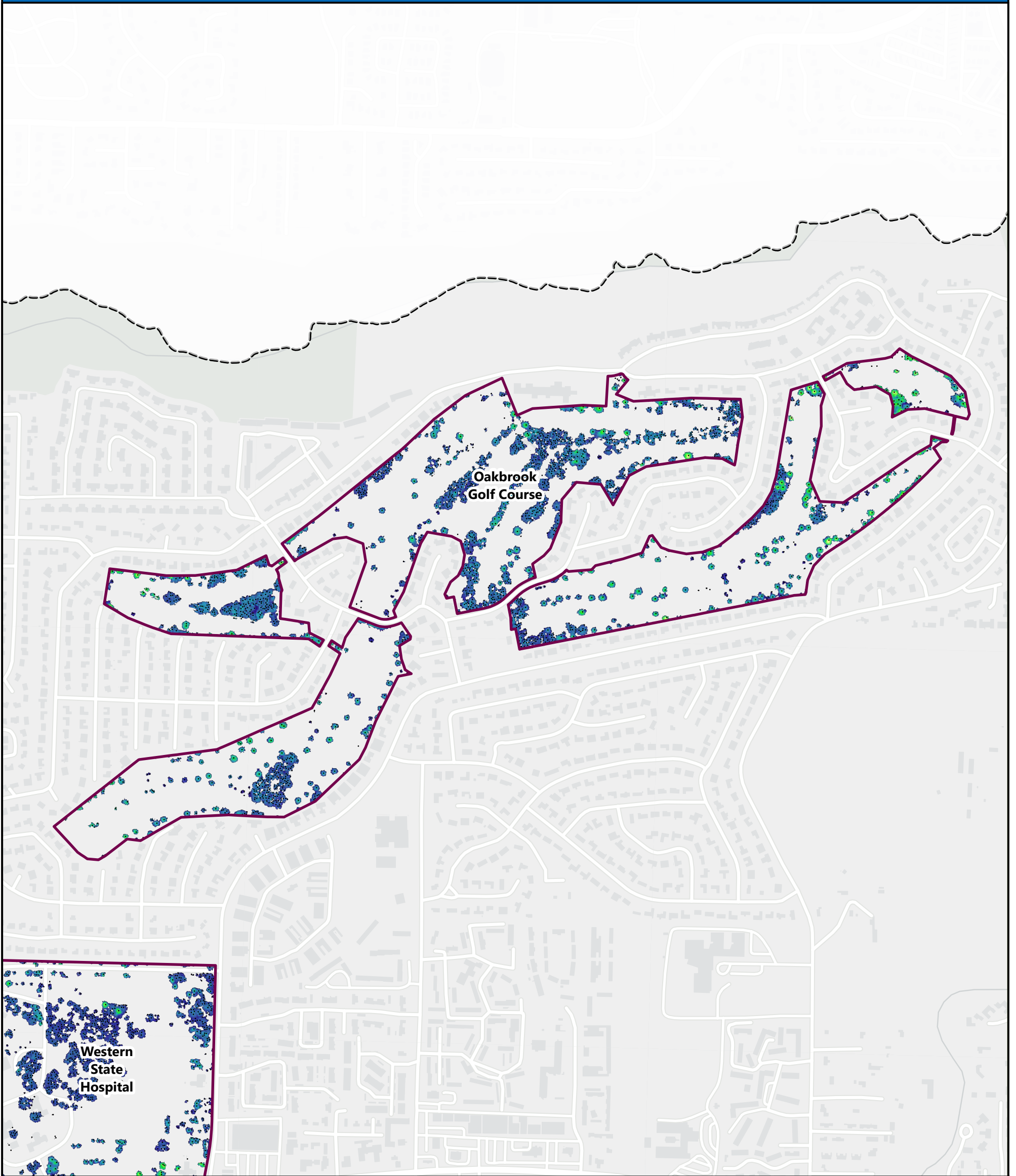


Print Date: 1/24/2025








# LAKWOOD CHM - OAKBROOK GOLF COURSE

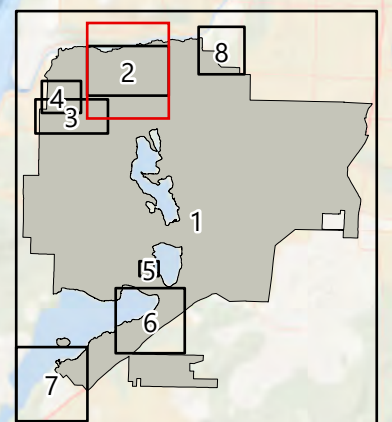
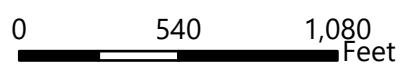
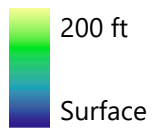


## LAKWOOD APPENDIX MAPS

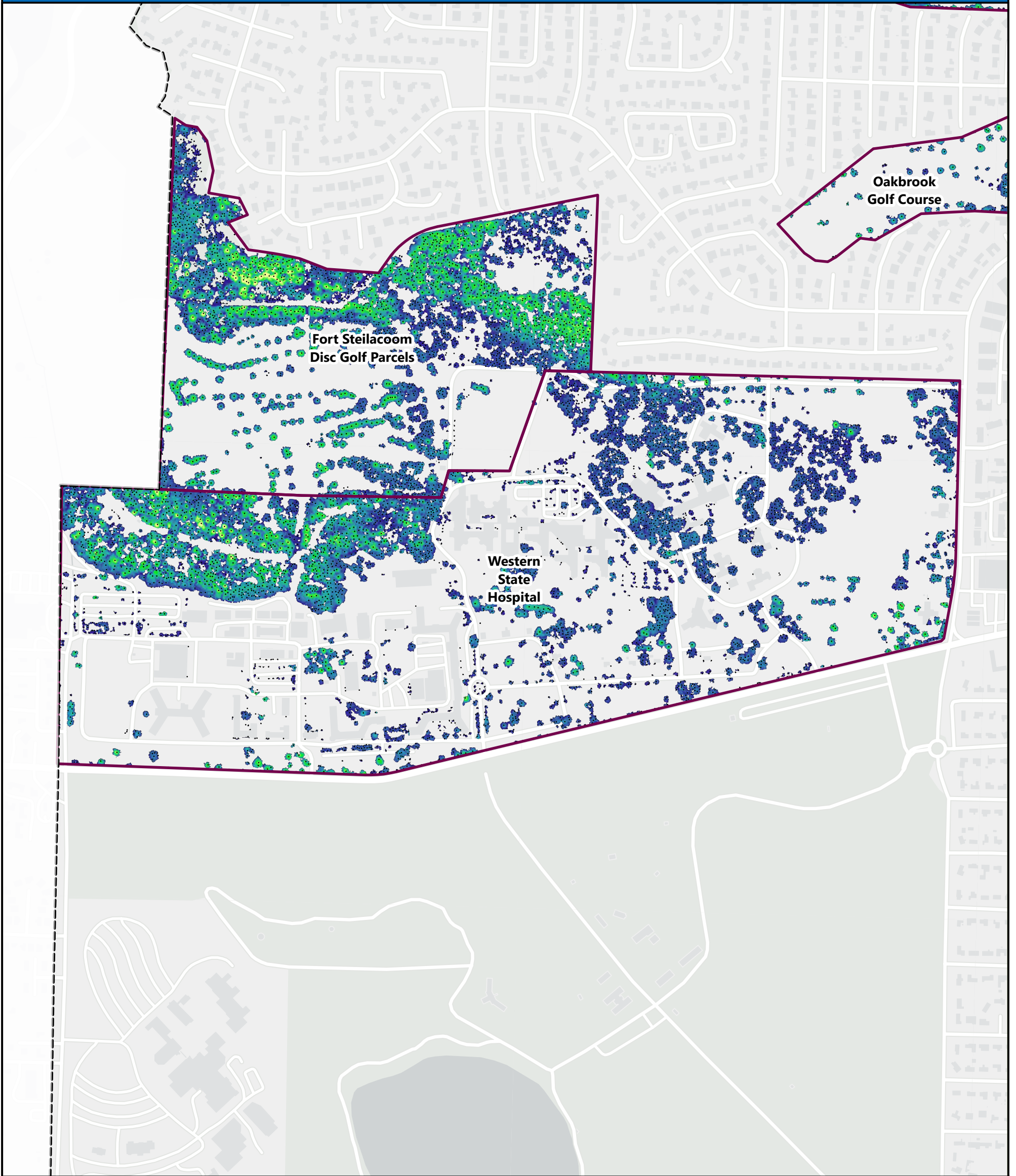
### LAYERS

-  City Boundary
-  Site Boundary
-  Tree Canopy Tops

### Canopy Height






# LAKWOOD CHM - WESTERN STATE HOSPITAL

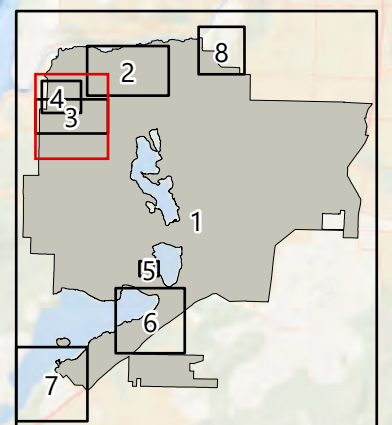
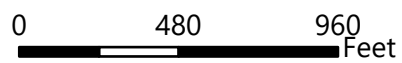
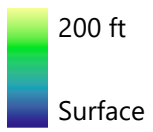


## LAKWOOD APPENDIX MAPS

### LAYERS

-  City Boundary
-  Site Boundary
-  Tree Canopy Tops

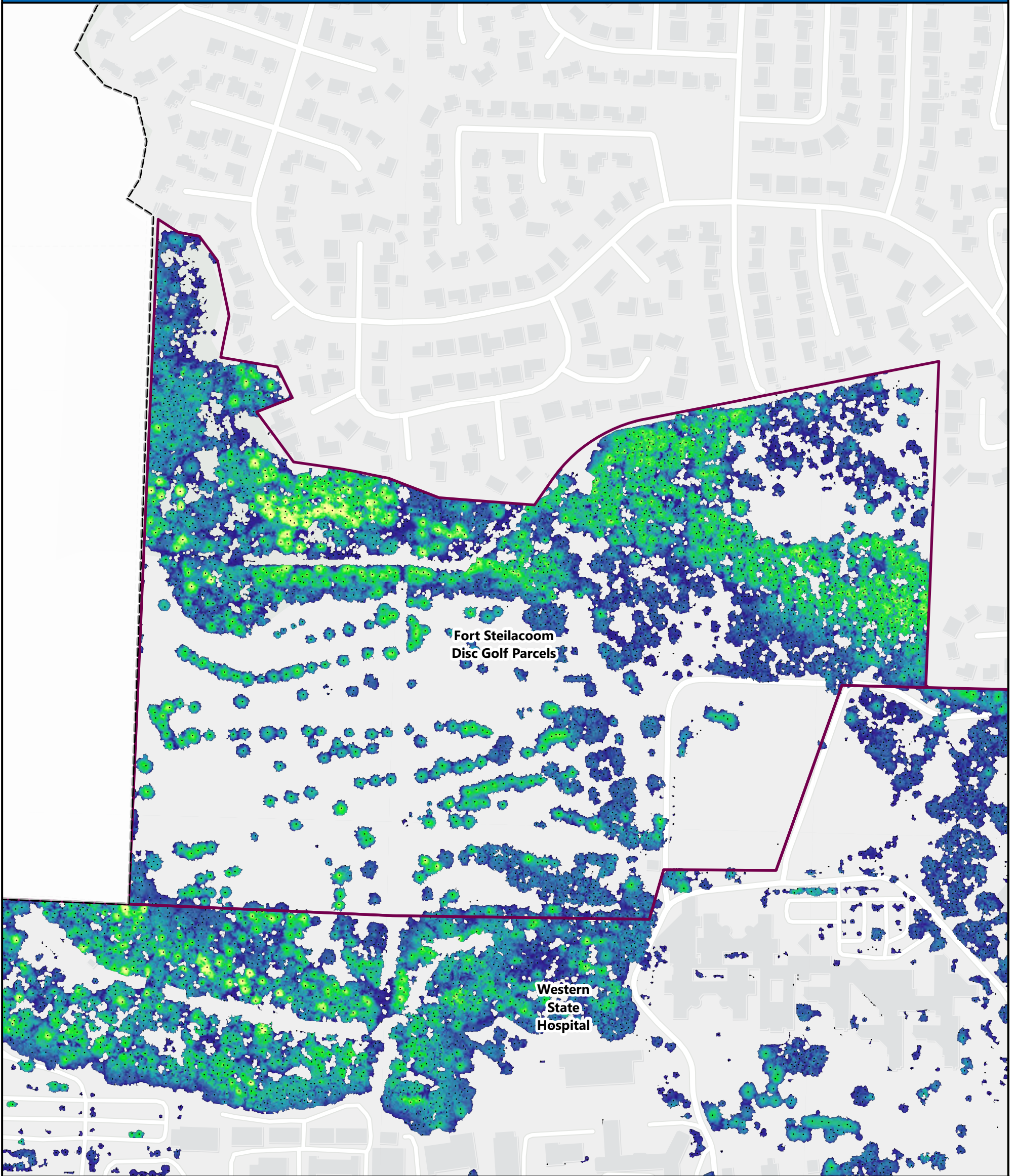
### Canopy Height



Print Date: 1/24/2025



# LAKWOOD CHM - FORT STEILACOOM DISC GOLF

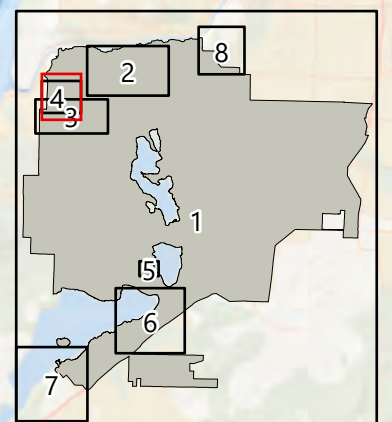
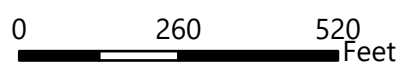
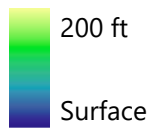


## LAKWOOD APPENDIX MAPS

### LAYERS

- City Boundary
- Site Boundary
- Tree Canopy Tops

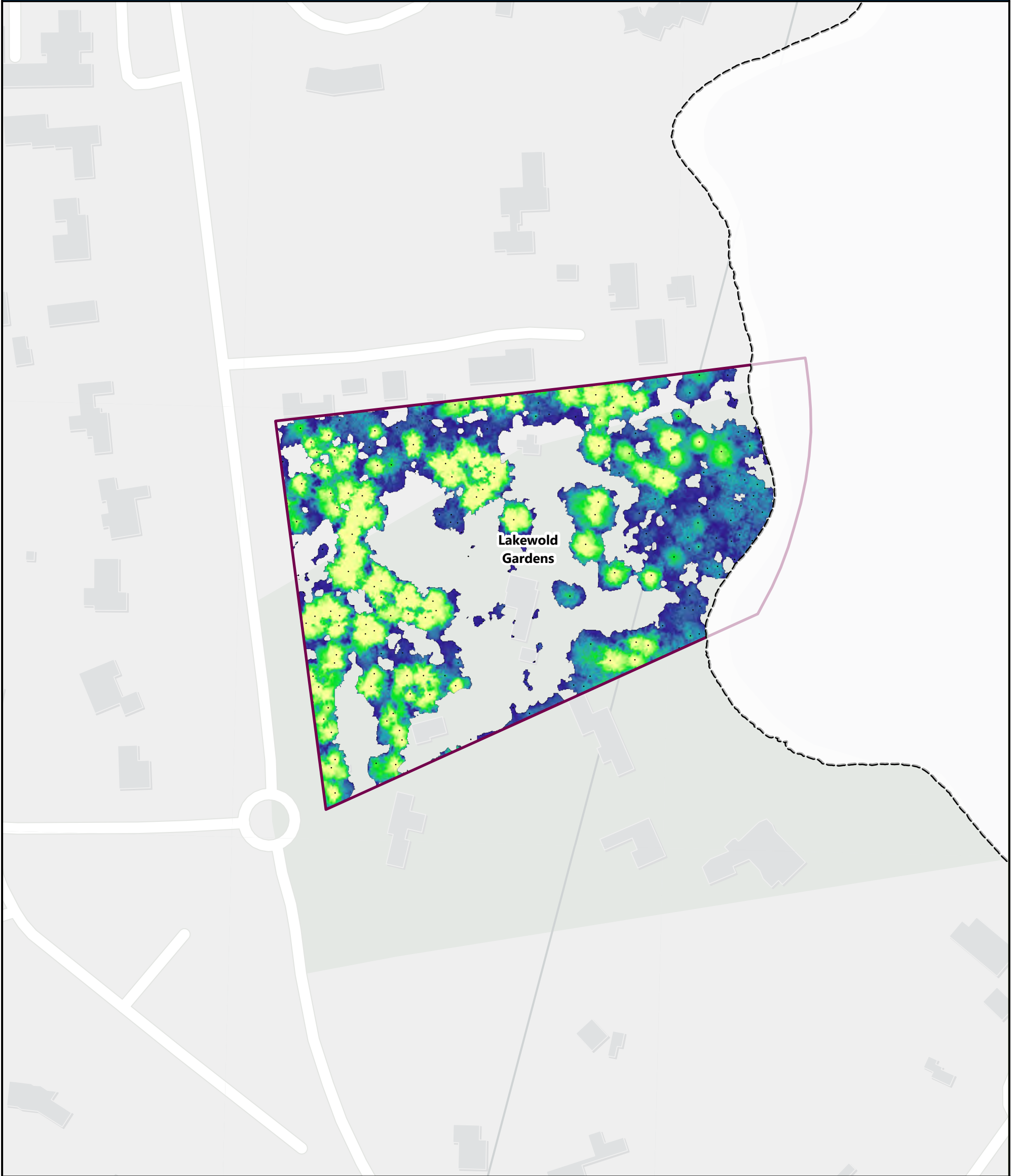
### Canopy Height



Print Date: 1/24/2025






# LAKEWOOD CHM - LAKEWOLD GARDENS

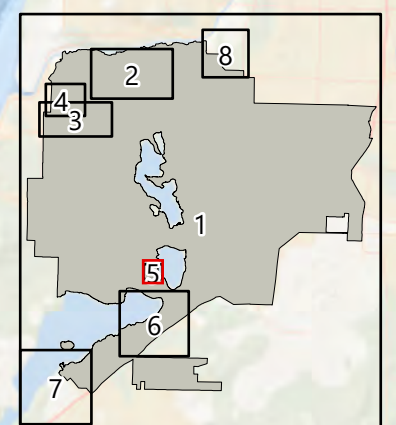
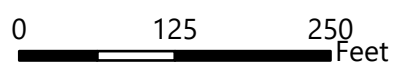
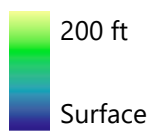


## LAKEWOOD APPENDIX MAPS

### LAYERS

-  City Boundary
-  Site Boundary
-  Tree Canopy Tops

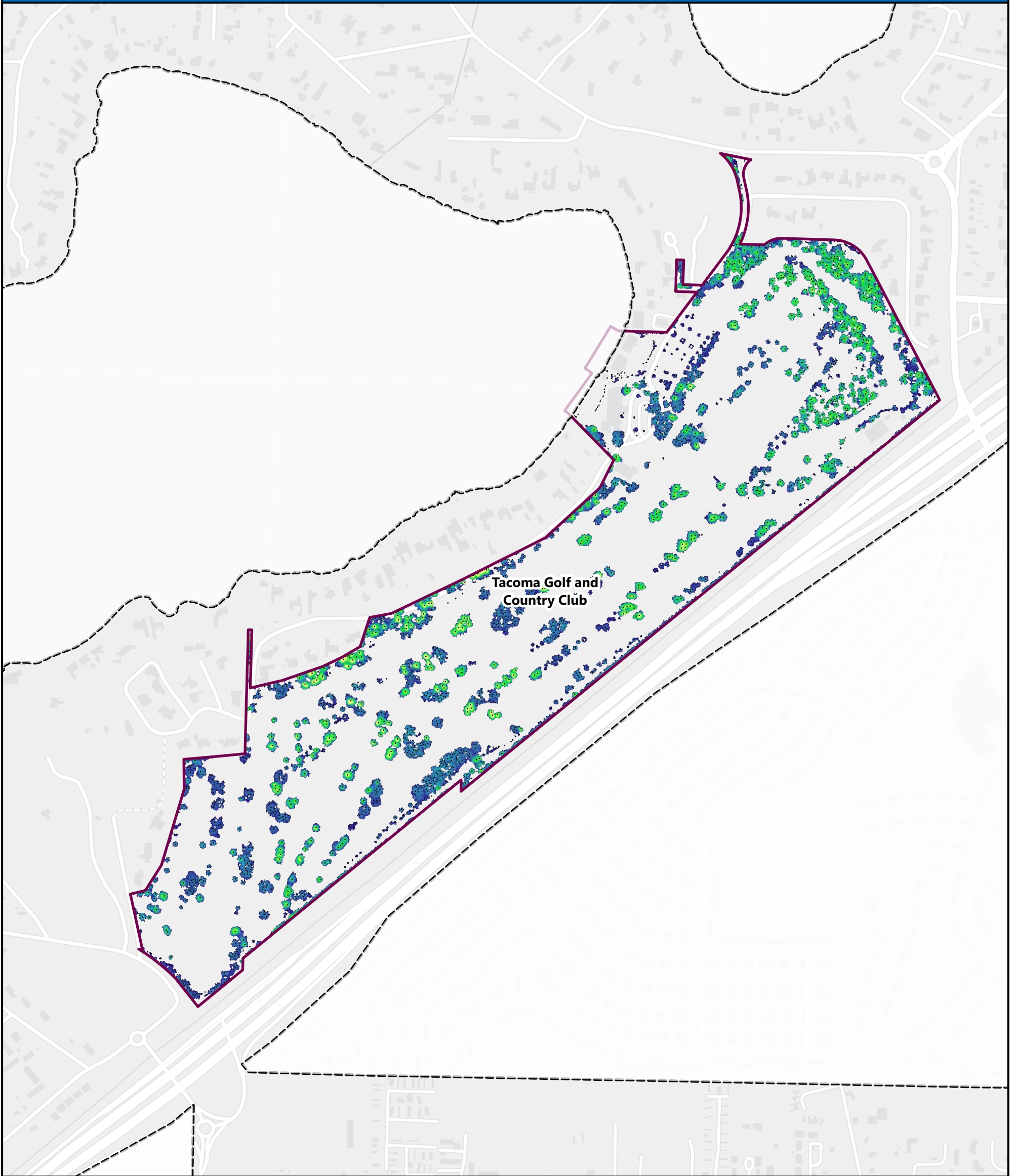
### Canopy Height



Print Date: 1/24/2025






# LAKWOOD CHM - TACOMA GOLF & COUNTRY CLUB

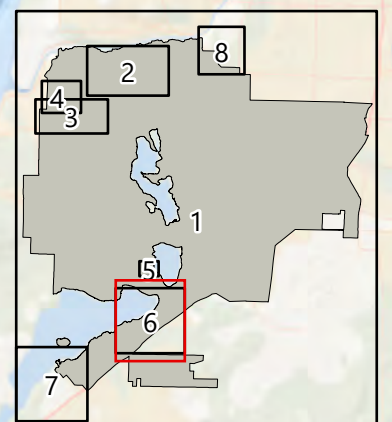
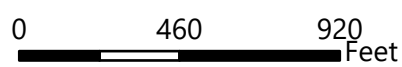
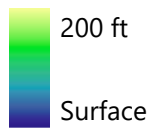


## LAKWOOD APPENDIX MAPS

### LAYERS

-  City Boundary
-  Site Boundary
-  Tree Canopy Tops

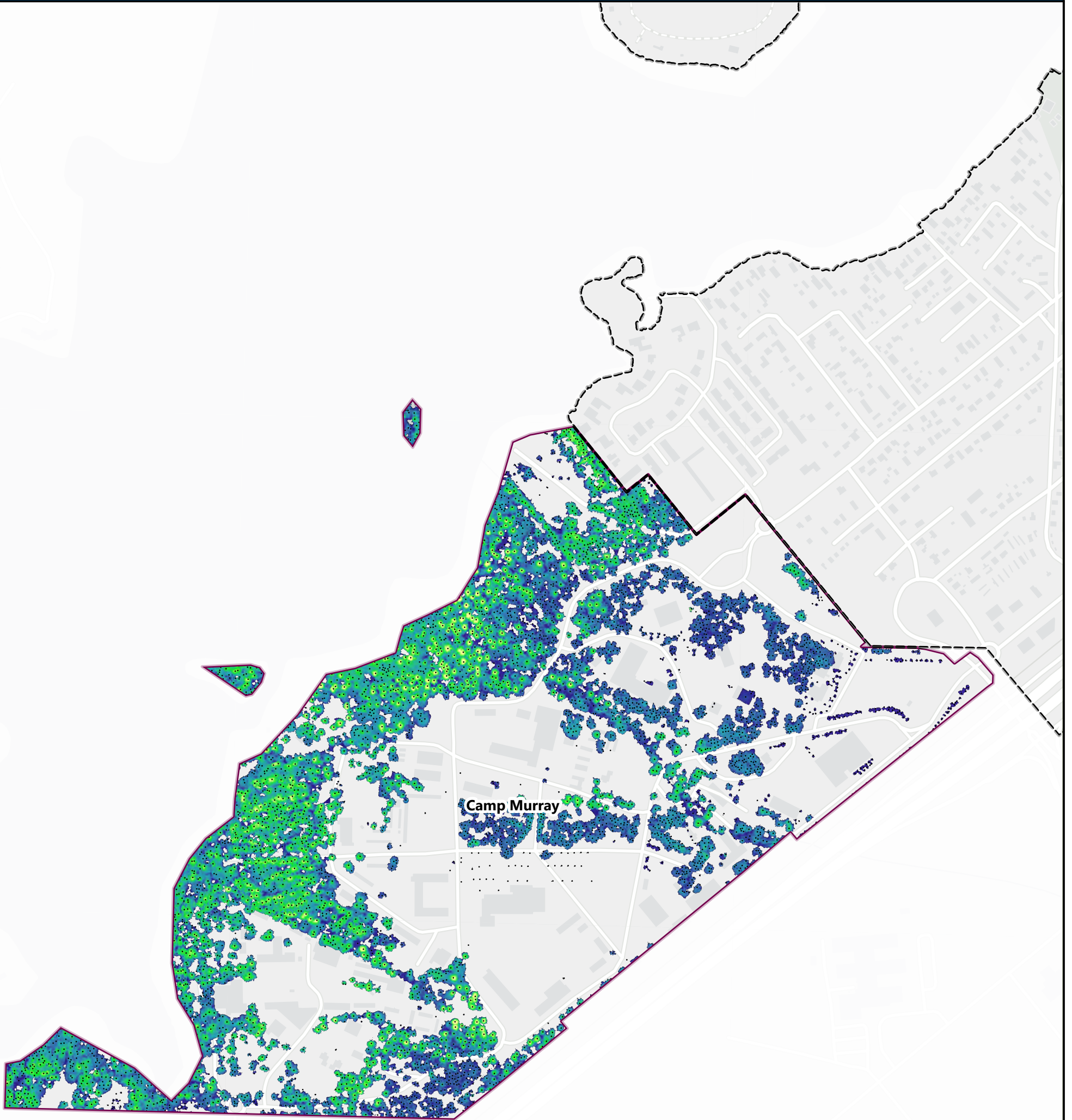
### Canopy Height



Print Date: 1/24/2025






# LAKWOOD CHM - CAMP MURRAY





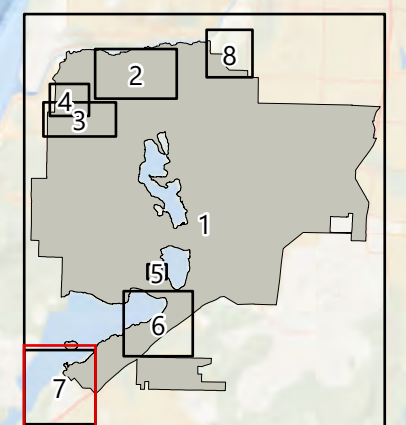
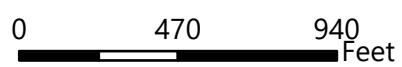
## LAKWOOD APPENDIX MAPS

### LAYERS

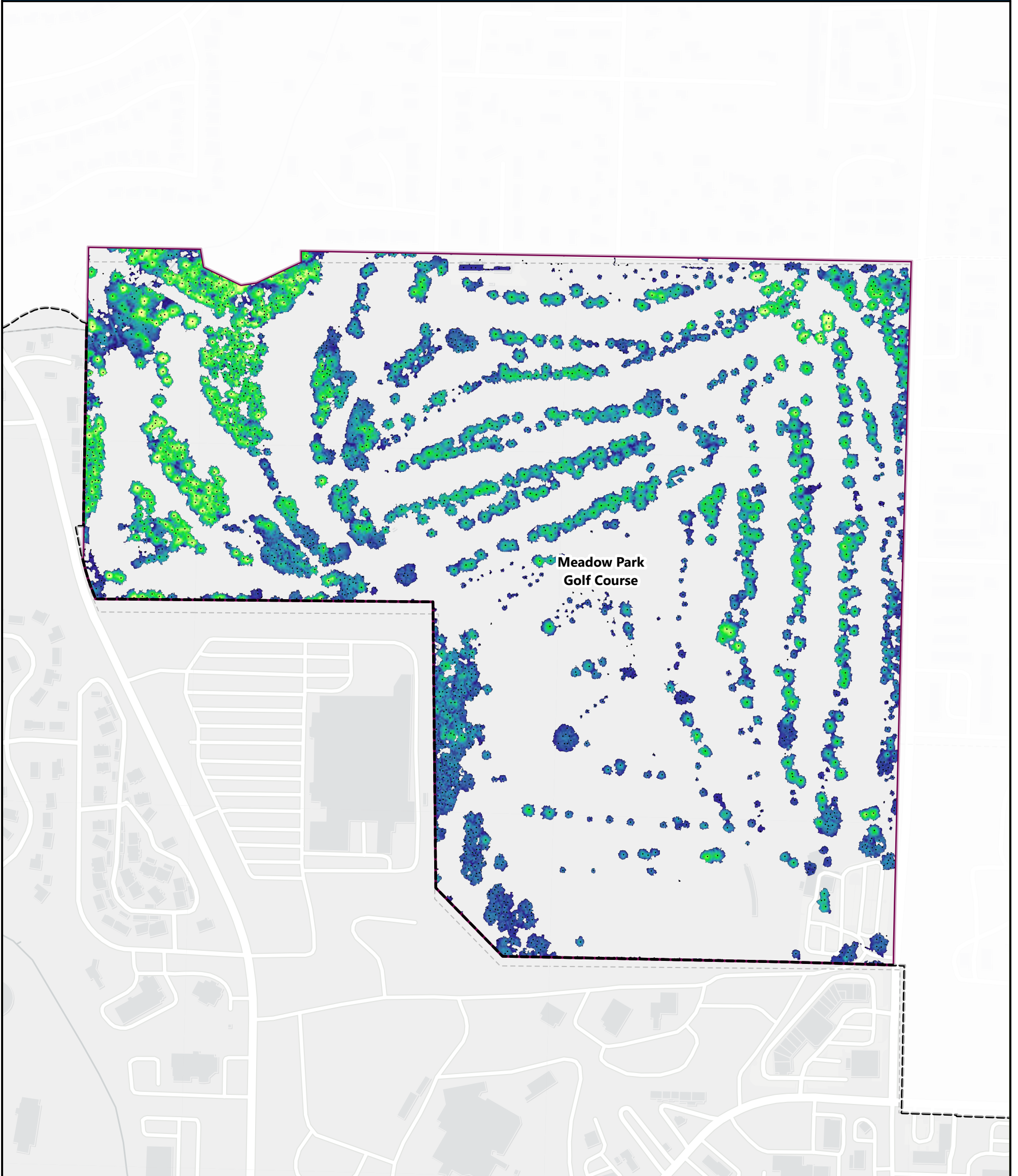
-  City Boundary
-  Site Boundary
-  Tree Canopy Tops

### Canopy Height

-  200 ft
-  Surface






# LAKWOOD CHM - MEADOW PARK GOLF COURSE

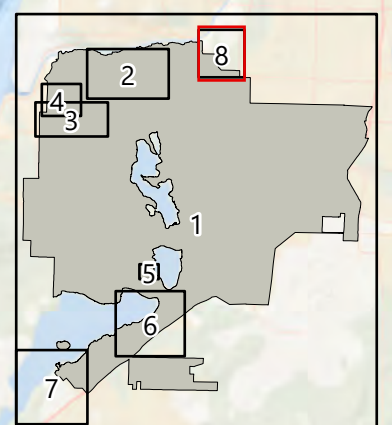
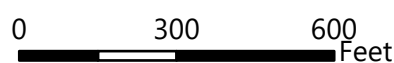
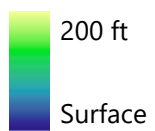


## LAKWOOD APPENDIX MAPS

### LAYERS

-  City Boundary
-  Site Boundary
-  Tree Canopy Tops

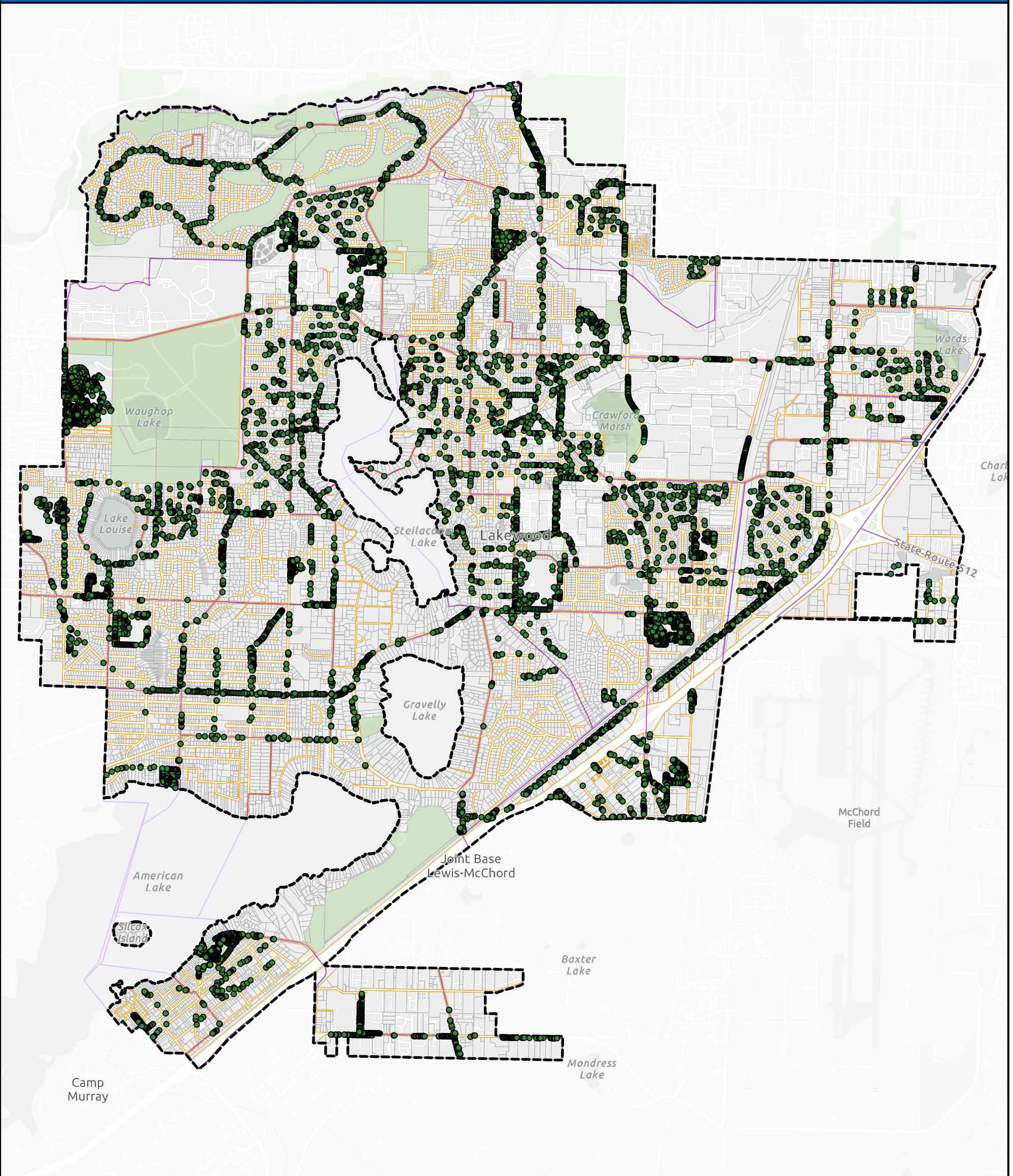
### Canopy Height



Print Date: 1/24/2025

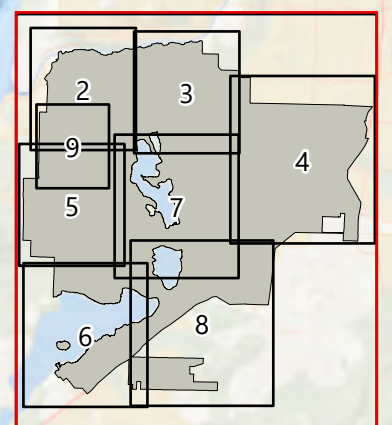
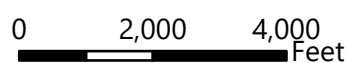


# LAKWOOD TREE INVENTORY



## LAKWOOD APPENDIX MAPS

- LAYERS**
- Tree Inventory Locations
  - ▭ City Boundary
  - ▭ Right of Way
  - ▭ Parcels
  - ▭ Parks
  - ▭ Census Block Groups

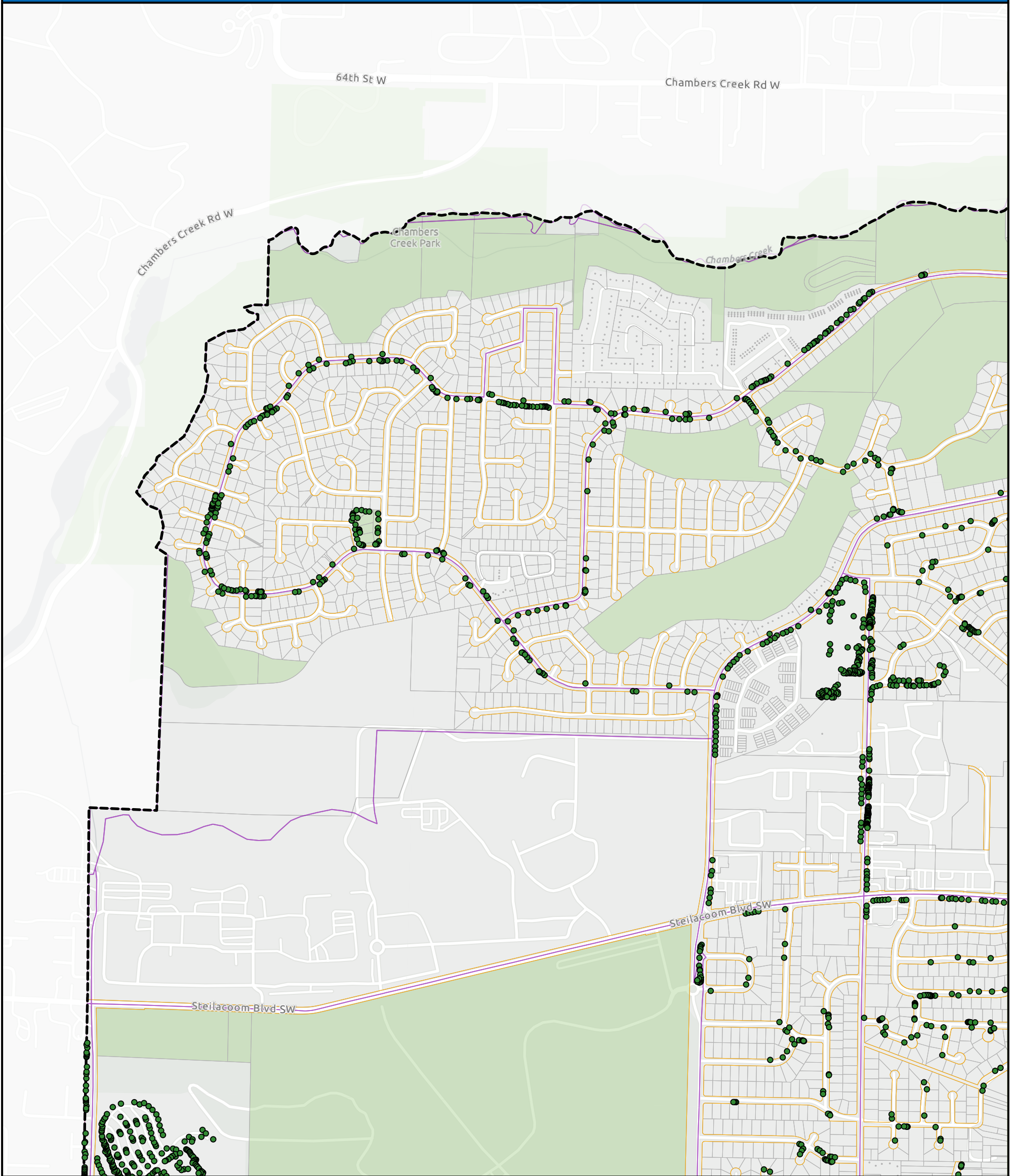


Print Date: 12/18/2024





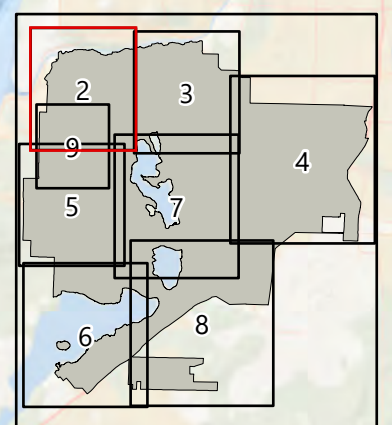
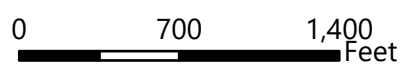
# LAKWOOD TREE INVENTORY



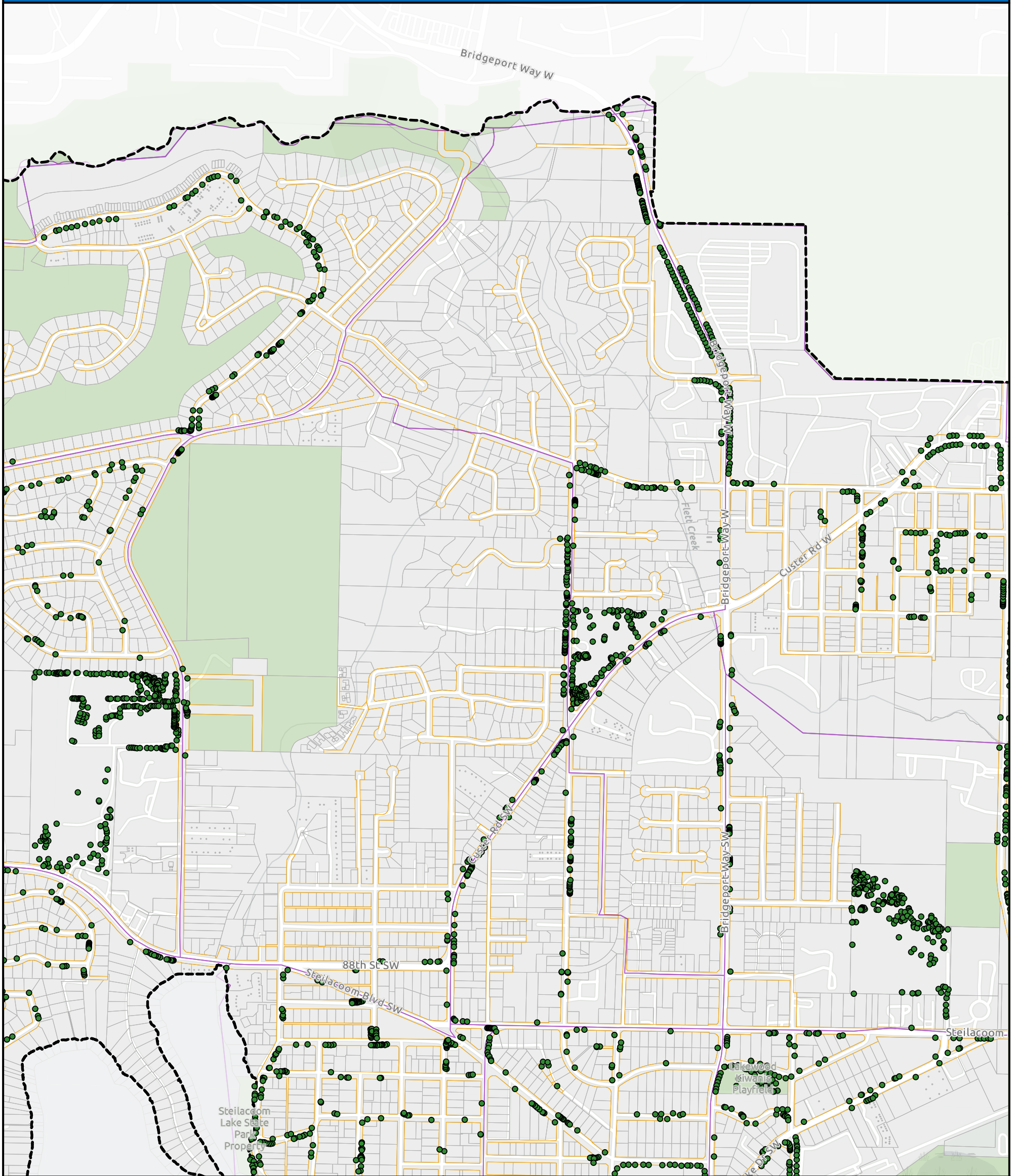
## LAKWOOD APPENDIX MAPS

### LAYERS

- Tree Inventory Locations
- City Boundary
- Right of Way
- Parcels
- Parks
- Census Block Groups



# LAKWOOD TREE INVENTORY

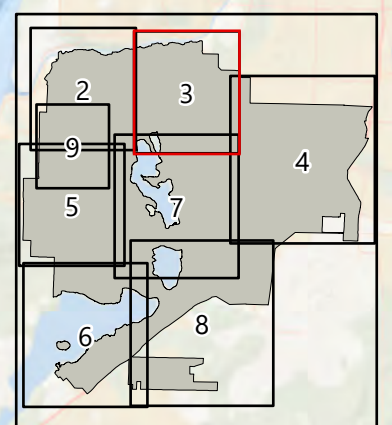


## LAKWOOD APPENDIX MAPS

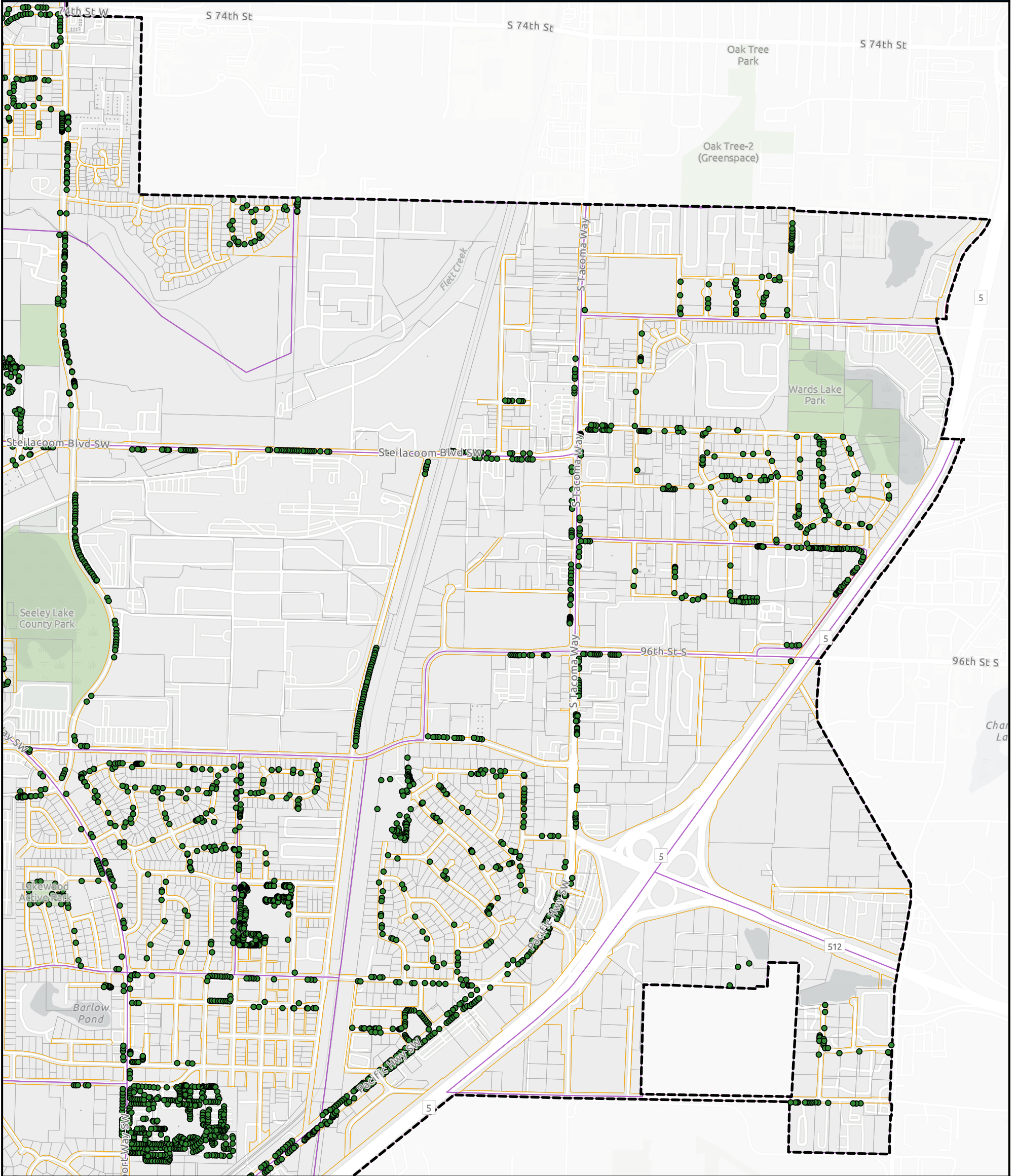
### LAYERS

- Tree Inventory Locations
- City Boundary
- Right of Way
- Parcels
- Parks
- Census Block Groups

0 700 1,400 Feet



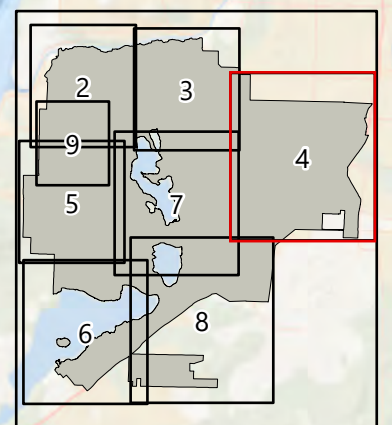
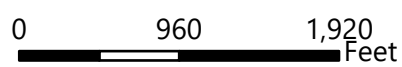
# LAKWOOD TREE INVENTORY



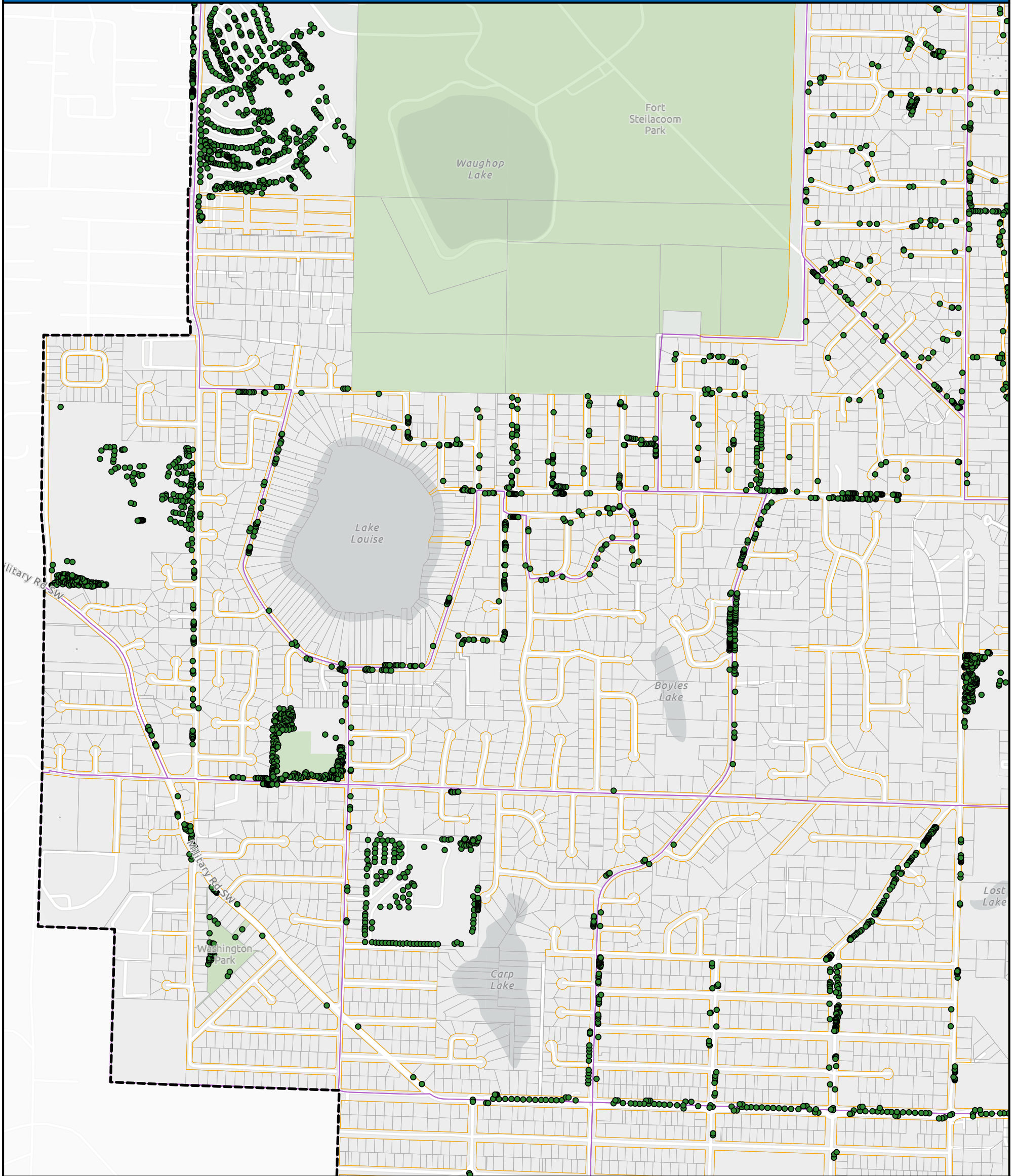
## LAKWOOD APPENDIX MAPS

### LAYERS

- Tree Inventory Locations
- City Boundary
- Right of Way
- Parcels
- Parks
- Census Block Groups



# LAKWOOD TREE INVENTORY

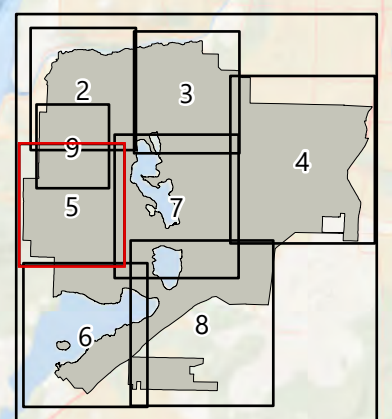


## LAKWOOD APPENDIX MAPS

### LAYERS

- Tree Inventory Locations
- City Boundary
- Right of Way
- Parcels
- Parks
- Census Block Groups

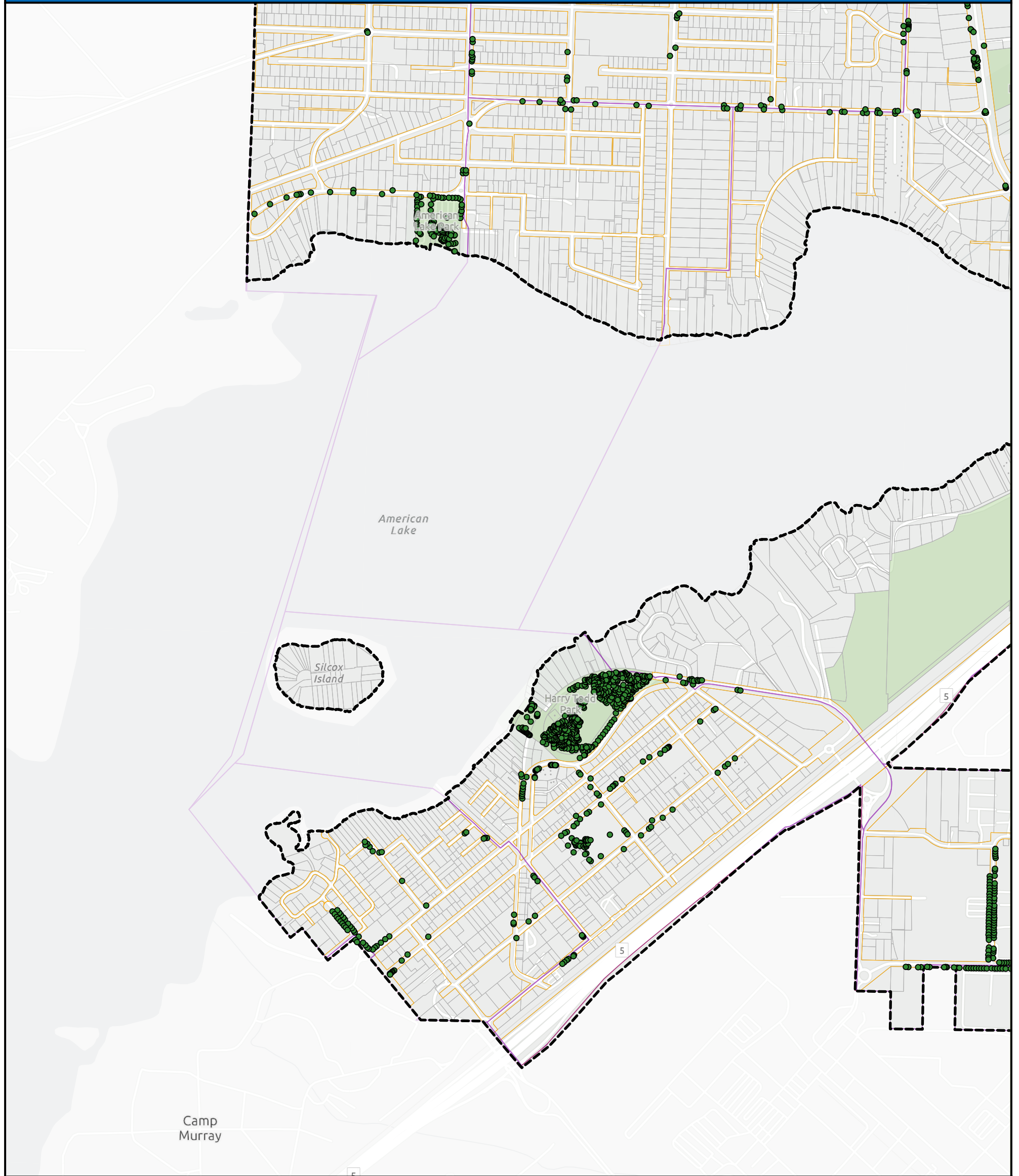
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Print Date: 12/18/2024



# LAKESWOOD TREE INVENTORY

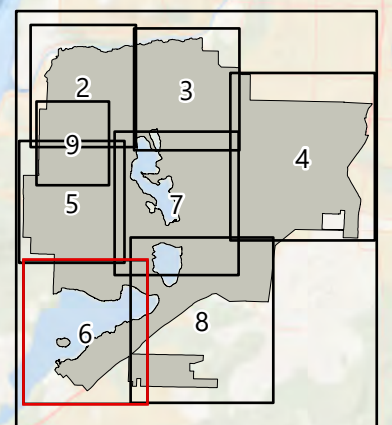


## LAKESWOOD APPENDIX MAPS

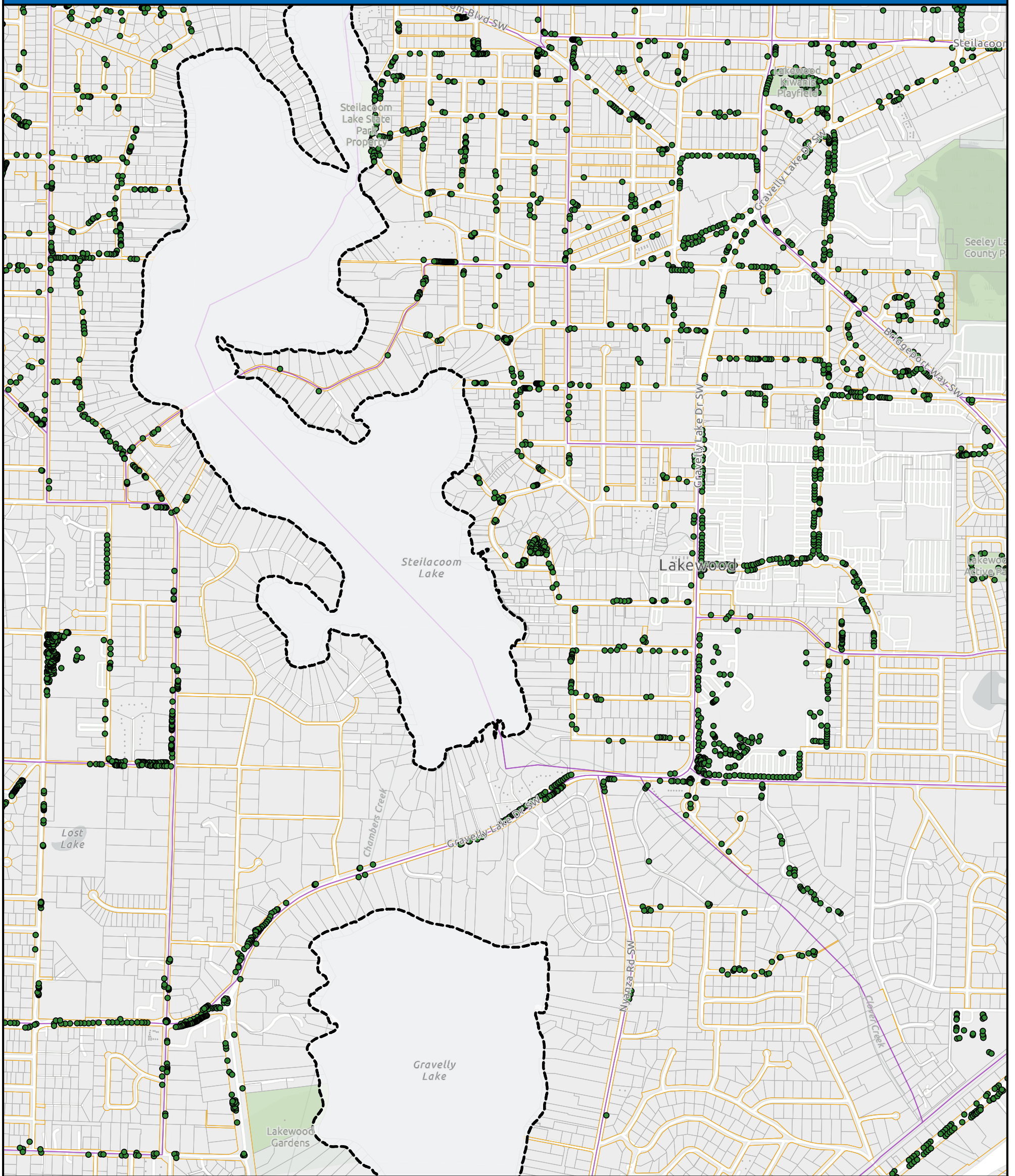
### LAYERS

- Tree Inventory Locations
- ▭ City Boundary
- ▭ Right of Way
- ▭ Parcels
- ▭ Parks
- ▭ Census Block Groups

0 820 1,640 Feet



# LAKWOOD TREE INVENTORY

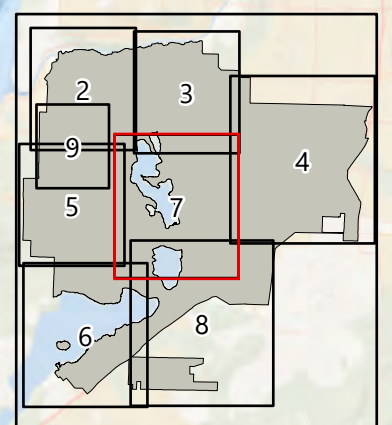


## LAKWOOD APPENDIX MAPS

### LAYERS

- Tree Inventory Locations
- City Boundary
- Right of Way
- Parcels
- Parks
- Census Block Groups

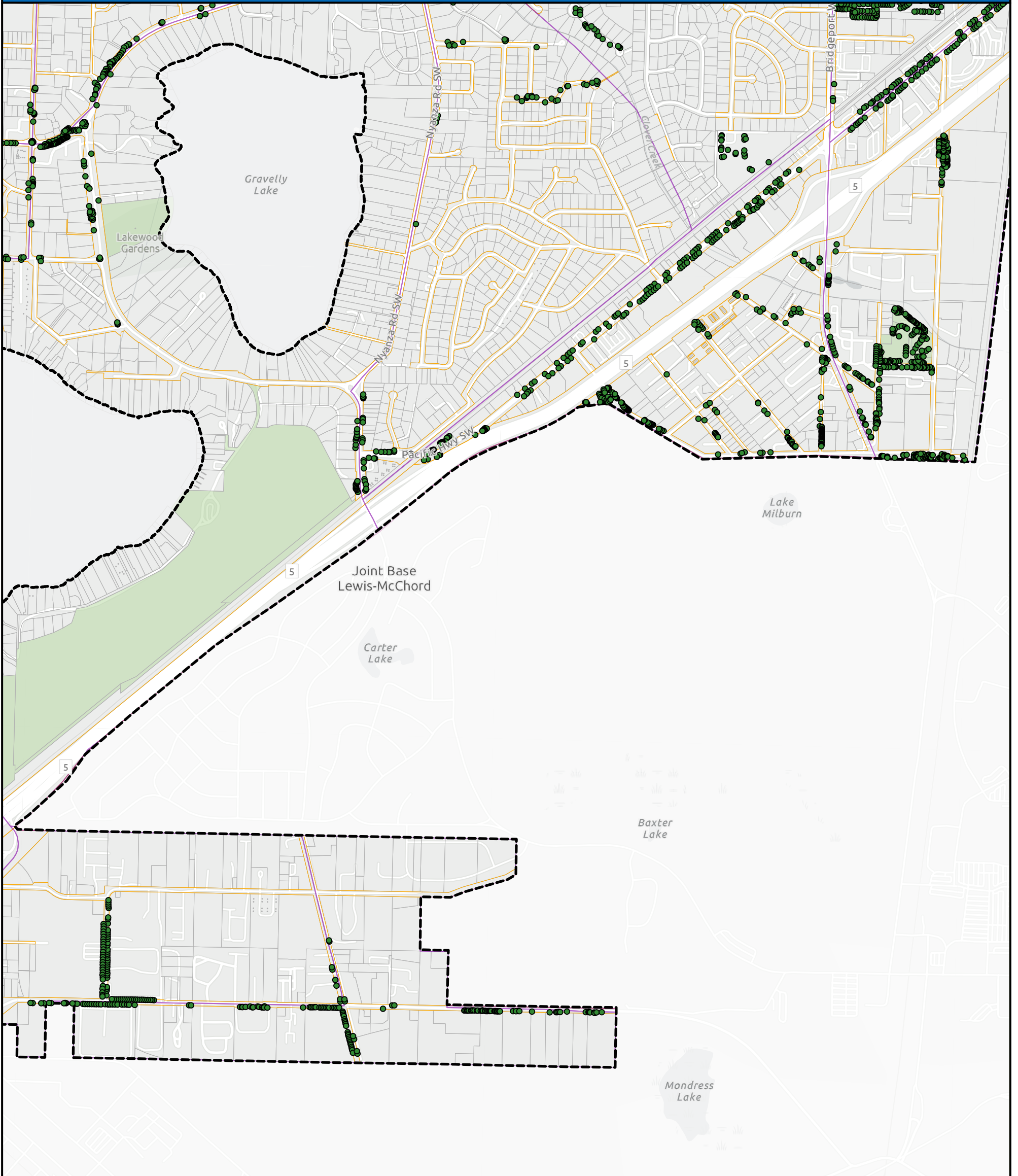
0 820 1,640 Feet



Print Date: 12/18/2024



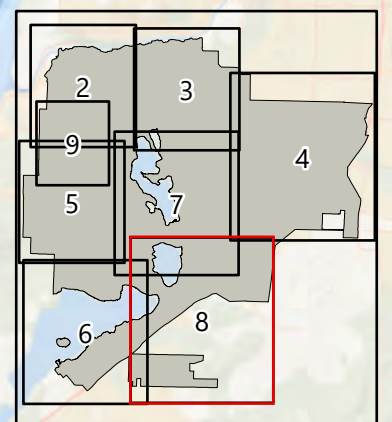
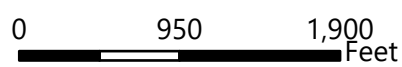
# LAKWOOD TREE INVENTORY



## LAKWOOD APPENDIX MAPS

### LAYERS

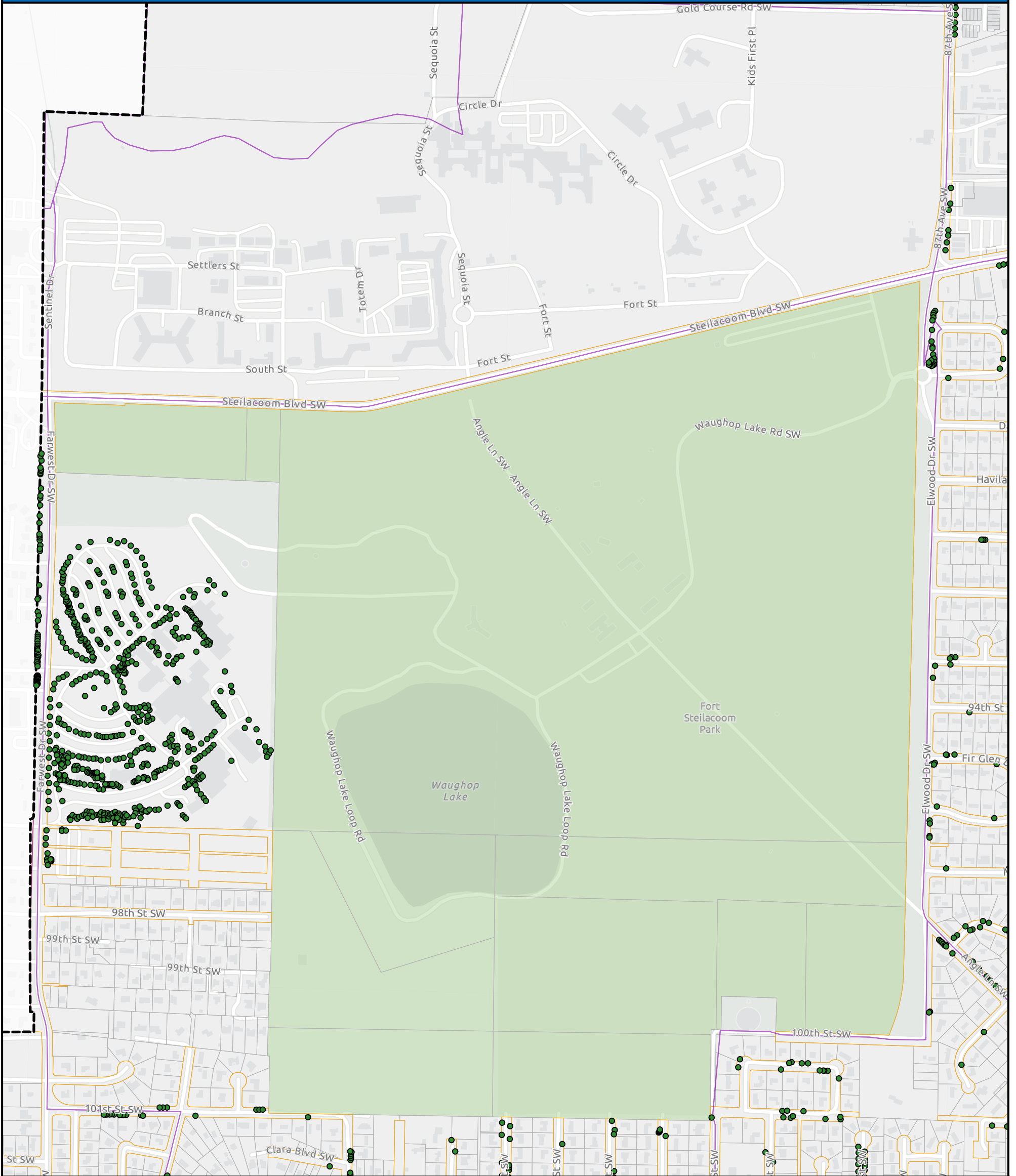
- Tree Inventory Locations
- City Boundary
- Right of Way
- Parcels
- Parks
- Census Block Groups



Print Date: 12/18/2024



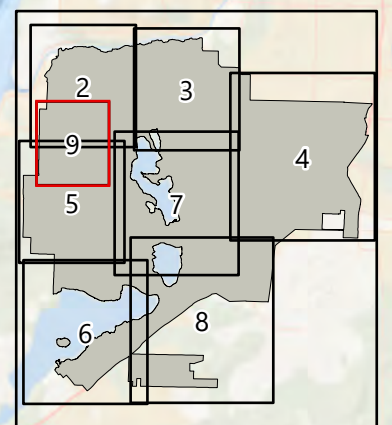
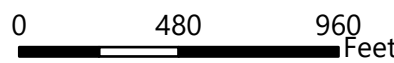
# LAKWOOD TREE INVENTORY



## LAKWOOD APPENDIX MAPS

### LAYERS

- Tree Inventory Locations
- City Boundary
- Right of Way
- Parcels
- Parks
- Census Block Groups



Print Date: 12/18/2024





# APPENDIX E. Tree Inventory Data

**Table B1. Invenoried tree species summary data by city zoning designation, rounded to nearest whole number.**

Zoning	CC	#T	MDBH	D0	D25	D50	D75	D100	DC1	DC2	DC3	DC4	DC5	MR	C1	C2	C3	C4	C5	C6	SR	GR
Air Corridor 1	9.8%	96	16	5	8	12	18	46	2%	47%	24%	20%	7%	11	0%	65%	28%	4%	0%	3%	21	15
Air Corridor 2	21.3%	169	16	2	8	16	24	39	14%	21%	22%	16%	27%	12	1%	73%	24%	2%	0%	0%	39	25
Arterial Residential/Commercial	24.3%	40	17	2	9	15	25	35	5%	38%	13%	18%	28%	14	0%	53%	43%	3%	0%	3%	10	8
Central Business District	11.1%	605	12	0	7	11	16	57	17%	36%	29%	11%	7%	12	1%	63%	27%	4%	1%	3%	62	34
Clear Zone	2.9%	31	9	2	4	10	12	23	39%	32%	26%	3%	0%	7	0%	74%	23%	3%	0%	0%	13	10
Commercial 1	5.4%	152	9	2	7	8	10	35	12%	77%	7%	3%	2%	11	0%	63%	24%	10%	0%	4%	10	7
Commercial 2	5.6%	233	8	1	6	7	9	31	27%	58%	9%	3%	1%	8	0%	67%	24%	7%	0%	1%	19	11
Commercial 3	10.3%	28	7	2	3	7	10	12	32%	64%	4%	0%	0%	8	0%	93%	7%	0%	0%	0%	3	3
Industrial 1	6.3%	152	12	3	7	9	13	48	18%	55%	11%	9%	9%	10	0%	67%	30%	1%	0%	1%	10	9
Industrial 2	7.9%	1	20	20	20	20	20	20	0%	0%	0%	100%	0%	11	0%	100%	0%	0%	0%	0%	1	1
Industrial Business Park	11.0%	259	7	2	3	3	8	46	71%	11%	4%	5%	8%	8	0%	88%	11%	0%	0%	1%	20	15
Mixed Residential 1	11.0%	130	15	2	8	15	20	36	14%	22%	25%	22%	16%	12	0%	62%	32%	6%	0%	0%	37	23
Mixed Residential 2	23.3%	129	15	2	3	13	23	82	32%	15%	12%	16%	25%	13	7%	71%	20%	1%	0%	1%	27	21
Multifamily 1	23.4%	252	16	2	7	16	22	53	12%	27%	15%	23%	23%	13	0%	62%	20%	16%	1%	1%	39	24
Multifamily 2	25.2%	245	16	2	8	12	22	78	11%	37%	15%	17%	21%	13	0%	56%	38%	5%	0%	1%	37	24
Multifamily 3	15.7%	232	11	1	5	12	15	50	31%	22%	34%	11%	2%	10	0%	82%	14%	3%	0%	1%	26	21
Neighborhood Commercial 1	11.1%	11	13	2	2	13	16	34	36%	9%	36%	0%	18%	14	27%	36%	36%	0%	0%	0%	6	5
Neighborhood Commercial 2	11.3%	287	12	1	8	12	15	42	19%	33%	34%	10%	4%	10	0%	50%	40%	8%	1%	1%	37	24
Open Space & Recreation 1	34.5%	922	21	1	11	20	30	89	14%	14%	16%	17%	40%	15	1%	79%	17%	2%	0%	1%	43	29
Open Space & Recreation 2	25.1%	69	15	2	8	14	21	42	14%	29%	13%	25%	19%	11	0%	54%	29%	9%	4%	4%	12	10
Public Institutional	17.7%	3278	15	1	7	13	21	74	19%	26%	21%	16%	19%	13	0%	82%	15%	2%	0%	1%	92	50
Residential 1	48.1%	210	17	2	9	16	23	59	17%	15%	26%	21%	22%	9	0%	42%	49%	7%	1%	0%	20	16
Residential 2	44.9%	198	17	2	8	15	24	81	18%	18%	25%	13%	26%	12	1%	59%	36%	1%	0%	3%	21	18
Residential 3	30.2%	2578	15	2	8	13	21	66	16%	27%	22%	15%	20%	12	1%	72%	23%	2%	1%	1%	104	55
Residential 4	23.3%	1168	14	1	6	12	20	60	23%	25%	21%	12%	20%	12	4%	72%	19%	4%	0%	1%	92	50
Right Of Way	4.4%	53	15	3	6	16	21	34	28%	13%	19%	15%	25%	12	0%	85%	15%	0%	0%	0%	3	3
Transit Oriented Commercial	0.4%	254	9	2	7	9	12	38	16%	62%	20%	0%	2%	10	0%	69%	28%	2%	0%	2%	16	11
<b>Lakewood Total</b>	<b>24.4%</b>	<b>11782</b>	<b>15</b>	<b>0</b>	<b>7</b>	<b>13</b>	<b>20</b>	<b>89</b>	<b>19%</b>	<b>28%</b>	<b>21%</b>	<b>14%</b>	<b>18%</b>	<b>12</b>	<b>1%</b>	<b>73%</b>	<b>21%</b>	<b>3%</b>	<b>0%</b>	<b>1%</b>	<b>161</b>	<b>69</b>

CC: Canopy cover  
 #T: Number of trees  
 MDBH: Mean DBH  
 SR: Species richness  
 GR: Genus richness

MDBH: Mean DBH  
 D25: DBH 25<sup>th</sup> percentile  
 D50: DBH 50<sup>th</sup> percentile (median)  
 D75: DBH 75<sup>th</sup> percentile  
 D100: DBH maximum

DC1: DBH category 1, 0-6 inches  
 DC2: DBH category 2, 6-12 inches  
 DC3: DBH category 3, 12-18 inches  
 DC4: DBH category 4, 18-24 inches  
 DC5: DBH category 5, >24 inches

C1: Condition rating category 1, excellent  
 C2: Condition rating category 2, good  
 C3: Condition rating category 3, fair  
 C4: Condition rating category 4, poor  
 C5: Condition rating category 5, very poor  
 C6: Condition rating category 6, dead

**Table B2. Inventoried tree species summary data by census block group, rounded to nearest whole number.**

TCT	B	GID	CC	#T	MDBH	D0	D25	D50	D75	D100	DC1	DC2	DC3	DC4	DC5	MR	C1	C2	C3	C4	C5	C6	SR	GR
71706	1	530530717061	6.1%	40	10	2	5	11	13	23	0	33%	25%	10%	0%	8	0%	73%	20%	8%	0%	0%	14	11
71803	1	530530718031	20.3%	342	16	2	7	16	23	48	0	22%	16%	20%	23%	15	0%	85%	12%	1%	0%	2%	22	17
71803	2	530530718032	10.7%	292	12	1	6	9	16	55	0	41%	12%	10%	13%	10	0%	57%	32%	10%	0%	2%	31	20
71803	3	530530718033	29.4%	28	15	2	5	11	27	38	0	21%	11%	7%	32%	11	0%	82%	11%	7%	0%	0%	10	10
71803	4	530530718034	20.1%	119	8	1	3	5	10	35	1	13%	7%	7%	9%	5	0%	51%	36%	6%	0%	7%	17	13
71805	1	530530718051	8.1%	217	10	2	5	7	15	74	0	42%	15%	10%	5%	8	0%	79%	19%	1%	0%	0%	38	26
71805	2	530530718052	8.7%	160	14	3	9	15	20	32	0	24%	33%	23%	8%	12	0%	64%	29%	7%	0%	0%	40	27
71805	3	530530718053	10.6%	507	12	1	7	11	16	42	0	36%	32%	9%	4%	11	0%	76%	19%	4%	0%	1%	48	30
71806	1	530530718061	13.9%	407	13	2	7	10	18	44	0	48%	14%	14%	13%	12	0%	58%	28%	11%	0%	3%	25	19
71806	2	530530718062	20.4%	446	13	1	6	10	18	78	0	37%	12%	12%	14%	11	0%	70%	25%	3%	0%	2%	38	25
71807	1	530530718071	12.1%	444	14	2	7	10	17	66	0	44%	15%	8%	16%	13	0%	57%	36%	3%	0%	3%	43	27
71807	2	530530718072	11.8%	466	13	2	7	10	16	59	0	42%	20%	8%	14%	12	0%	73%	21%	5%	0%	0%	45	28
71808	1	530530718081	13.6%	44	19	2	8	21	27	39	0	18%	5%	20%	41%	14	0%	89%	11%	0%	0%	0%	17	12
71808	2	530530718082	23.7%	163	14	2	7	13	20	42	0	29%	23%	14%	18%	11	1%	67%	30%	2%	0%	0%	32	22
71808	3	530530718083	13.2%	107	13	5	8	10	17	46	0	54%	20%	16%	7%	10	0%	60%	34%	4%	0%	3%	20	13
71901	1	530530719011	13.9%	649	14	0	7	13	18	57	0	31%	28%	11%	15%	13	1%	67%	24%	6%	1%	2%	72	42
71901	2	530530719012	13.5%	201	21	3	14	20	27	82	0	18%	24%	21%	35%	17	0%	53%	44%	2%	0%	0%	28	18
71901	3	530530719013	15.7%	102	15	6	10	12	16	51	0	50%	28%	9%	13%	10	4%	54%	31%	11%	0%	0%	20	14
71901	4	530530719014	34.8%	80	18	3	12	18	22	60	0	19%	23%	31%	20%	12	6%	53%	28%	9%	5%	0%	16	13
71902	1	530530719021	28.5%	335	18	2	9	15	24	81	0	23%	26%	15%	25%	14	1%	80%	16%	1%	0%	2%	44	27
71902	2	530530719022	29.6%	293	18	1	10	15	26	89	0	29%	21%	12%	29%	14	3%	79%	17%	0%	0%	0%	33	24
71902	3	530530719023	39.0%	263	20	2	11	18	28	52	0	19%	21%	17%	35%	12	6%	61%	23%	3%	4%	2%	32	24
71902	4	530530719024	47.3%	150	15	3	8	13	20	47	0	27%	30%	17%	16%	9	0%	54%	43%	1%	1%	1%	13	12
71902	5	530530719025	38.0%	186	14	2	4	13	19	59	0	16%	27%	15%	13%	9	0%	42%	41%	16%	1%	1%	20	14
72000	1	530530720001	14.0%	92	5	2	3	3	3	42	1	0%	0%	0%	7%	6	0%	93%	7%	0%	0%	0%	7	6
72000	2	530530720002	21.2%	138	12	2	2	4	21	46	1	1%	11%	15%	20%	11	0%	64%	32%	0%	0%	4%	9	7
72000	3	530530720003	25.3%	580	23	1	15	23	31	55	0	13%	18%	20%	46%	16	0%	84%	14%	2%	0%	1%	26	18
72000	4	530530720004	21.8%	65	18	6	13	15	22	46	0	15%	52%	9%	20%	13	0%	91%	8%	0%	0%	2%	11	9
72105	1	530530721051	19.7%	152	16	4	11	14	20	53	0	32%	30%	19%	15%	11	0%	72%	16%	7%	1%	4%	26	18
72105	2	530530721052	29.1%	195	16	2	9	15	22	60	0	23%	22%	21%	22%	12	0%	57%	39%	2%	1%	1%	31	19
72105	4	530530721054	45.6%	127	16	3	9	16	22	33	0	24%	28%	20%	20%	12	0%	75%	19%	6%	0%	0%	32	22
72106	1	530530721061	41.1%	306	15	2	5	13	22	40	0	14%	22%	15%	20%	10	0%	80%	16%	3%	0%	2%	23	16
72106	2	530530721062	36.3%	117	16	2	7	16	22	66	0	25%	15%	23%	21%	10	0%	36%	58%	3%	3%	1%	18	13
72106	3	530530721063	18.1%	591	15	2	7	12	21	74	0	34%	18%	14%	18%	11	0%	83%	14%	2%	0%	0%	47	30
72106	4	530530721064	15.1%	156	19	4	14	18	24	53	0	14%	33%	24%	26%	15	0%	87%	11%	0%	0%	2%	11	8
72107	1	530530721071	20.7%	199	16	2	9	14	20	51	0	30%	29%	12%	20%	13	2%	81%	14%	2%	0%	1%	40	30
72107	2	530530721072	37.3%	493	16	2	9	14	20	60	0	24%	28%	18%	17%	13	0%	81%	17%	1%	0%	1%	41	25
72107	3	530530721073	35.3%	157	14	2	6	11	20	50	0	37%	18%	17%	14%	12	0%	71%	27%	1%	0%	1%	33	23
72107	4	530530721074	25.3%	864	13	1	6	12	19	52	0	25%	22%	16%	13%	12	0%	85%	13%	1%	0%	0%	63	39
72108	1	530530721081	36.9%	330	14	2	6	12	22	60	0	23%	19%	11%	23%	12	5%	79%	15%	1%	0%	0%	31	21
72108	2	530530721082	20.4%	100	7	2	2	2	9	52	1	6%	8%	3%	10%	6	9%	87%	4%	0%	0%	0%	13	10
72108	3	530530721083	30.0%	14	5	2	2	2	2	25	1	0%	0%	7%	7%	7	14%	43%	43%	0%	0%	0%	4	4
72108	4	530530721084	25.1%	115	14	1	2	5	25	49	1	6%	3%	11%	28%	10	10%	69%	14%	4%	1%	2%	9	8
72108	5	530530721085	24.8%	213	9	1	3	4	15	45	1	7%	13%	7%	11%	9	8%	62%	26%	0%	2%	2%	22	15
72112	1	530530721121	18.1%	631	15	2	6	13	22	50	0	27%	16%	17%	20%	12	0%	91%	8%	1%	0%	1%	34	24
72112	3	530530721123	25.6%	96	16	2	6	12	25	60	0	36%	11%	11%	27%	12	0%	58%	42%	0%	0%	0%	12	11
72308	4	530530723084	46.2%	1	12	12	12	12	12	12	0	100%	0%	0%	0%	12	0%	100%	0%	0%	0%	0%	1	1
72312	1	530530723121	80.5%	1	6	6	6	6	6	6	0	100%	0%	0%	0%	6	0%	100%	0%	0%	0%	0%	1	1
72903	1	530530729031	-	2	15	15	15	15	15	15	0	0%	100%	0%	0%	10	0%	100%	0%	0%	0%	0%	1	1
72907	3	530530729073	-	6	9	3	7	8	10	18	0	67%	0%	17%	0%	8	0%	83%	0%	0%	0%	17%	4	4

TCT: Census tract number  
 B: Census block number group  
 GID: Unique census block group unique GEOID identifier.  
 CC: Canopy cover  
 #T: Number of trees

MDBH: Mean DBH  
 D0: DBH minimum  
 D25: DBH 25<sup>th</sup> percentile  
 D50: DBH 50<sup>th</sup> percentile (median)  
 D75: DBH 75<sup>th</sup> percentile  
 D100: DBH maximum

DC1: DBH category 1, 0-6 inches  
 DC2: DBH category 2, 6-12 inches  
 DC3: DBH category 3, 12-18 inches  
 DC4: DBH category 4, 18-24 inches  
 DC5: DBH category 5, >24 inches

C1: Condition rating category 1, excellent  
 C2: Condition rating category 2, good  
 C3: Condition rating category 3, fair  
 C4: Condition rating category 4, poor  
 C5: Condition rating category 5, very poor  
 C6: Condition rating category 6, dead

SR: Species richness  
 GR: Genus richness

Table B3. Inventoried tree species summary data.

Species	Common Name	#T	MDBH	DC1	DC2	DC3	DC4	DC5	C1	C2	C3	C4	C5	C6	NM	ADPT	VULN
<i>Abies grandis</i>	Grand fir	12	16	8%	25%	25%	25%	17%	0%	50%	8%	17%	8%	17%	8%	M	M-H
<i>Abies procera</i>	Noble fir	5	20	0%	0%	60%	20%	20%	0%	60%	40%	0%	0%	0%	20%	M	L-M
<i>Abies sp.</i>	Fir species	8	9	38%	25%	25%	0%	13%	13%	63%	25%	0%	0%	0%	13%	n/a	n/a
<i>Acer circinatum</i>	Vine maple	53	6	58%	34%	8%	0%	0%	0%	89%	9%	2%	0%	0%	2%	H	L-M
<i>Acer fremanii</i>	Freeman maple	65	10	9%	68%	20%	3%	0%	0%	75%	25%	0%	0%	0%	2%	n/a	n/a
<i>Acer ginnala</i>	Amur maple	1	4	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	n/a	n/a
<i>Acer grandidentatum</i>	Bigtooth maple	9	5	78%	22%	0%	0%	0%	0%	78%	22%	0%	0%	0%	11%	n/a	n/a
<i>Acer griseum</i>	Paperbark maple	11	5	91%	9%	0%	0%	0%	0%	100%	0%	0%	0%	0%	9%	L	H
<i>Acer macrophyllum</i>	Bigleaf maple	221	15	21%	29%	19%	10%	20%	0%	70%	23%	5%	0%	2%	0%	M	L-M
<i>Acer palmatum</i>	Japanese maple	114	9	29%	51%	16%	4%	1%	2%	87%	8%	4%	0%	0%	1%	M	L-M
<i>Acer palmatum</i> 'Bloodgood'	Japanese maple	2	6	50%	50%	0%	0%	0%	0%	100%	0%	0%	0%	0%	50%	M	L-M
<i>Acer platanoides</i>	Norway maple	603	13	9%	46%	25%	13%	7%	0%	72%	25%	1%	0%	1%	0%	H	M
<i>Acer platanoides</i> 'Crimson King'	Norway maple 'Crimson King'	70	13	21%	43%	20%	6%	10%	0%	67%	26%	7%	0%	0%	1%	H	M
<i>Acer rubrum</i>	Red maple	353	10	35%	33%	21%	10%	1%	0%	71%	18%	7%	1%	3%	0%	H	L
<i>Acer saccharinum</i>	Silver maple	51	13	25%	33%	16%	4%	22%	0%	69%	25%	6%	0%	0%	2%	M	L-M
<i>Acer saccharum</i>	Sugar maple	30	10	3%	80%	0%	17%	0%	0%	80%	17%	3%	0%	0%	3%	M	M-H
<i>Acer sp. &lt;tree&gt;</i>	Maple	5	16	20%	0%	40%	20%	20%	0%	60%	40%	0%	0%	0%	20%	n/a	n/a
<i>Aesculus hippocastanum</i>	Horsechestnut	16	13	25%	31%	13%	19%	13%	0%	94%	6%	0%	0%	0%	6%	M	M-H
<i>Ailanthus altissima</i>	Tree of Heaven	3	7	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	33%	H	M
<i>Albizia julibrissin</i>	Silktree	2	15	0%	0%	50%	50%	0%	0%	100%	0%	0%	0%	0%	50%	L	M
<i>Alnus rubra</i>	Red alder	22	6	77%	5%	14%	5%	0%	0%	91%	0%	5%	0%	5%	5%	L	H
<i>Amelanchier alnifolia</i>	Western serviceberry	2	6	50%	50%	0%	0%	0%	0%	100%	0%	0%	0%	0%	50%	n/a	n/a
<i>Amelanchier canadensis</i>	Shadblow serviceberry	3	3	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	33%	n/a	n/a
<i>Amelanchier sp.</i>	Serviceberry species	13	4	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	8%	n/a	n/a
<i>Araucaria araucana</i>	Monkey puzzle tree	4	12	0%	25%	75%	0%	0%	0%	100%	0%	0%	0%	0%	25%	n/a	n/a
<i>Arbutus menziesii</i>	Pacific madrone	286	11	21%	38%	24%	10%	6%	1%	86%	8%	1%	1%	2%	0%	M	L-M
<i>Arbutus unedo</i>	Pacific madrone	2	2	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	50%	H	L
<i>Betula nigra</i>	River birch	1	15	0%	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%	100%	M	L-M
<i>Betula papyrifera</i>	Paperbark Birch	10	5	70%	30%	0%	0%	0%	0%	70%	20%	10%	0%	0%	10%	M	L-M
<i>Betula pendula</i>	European white birch	60	12	13%	38%	32%	15%	2%	2%	53%	20%	18%	2%	5%	2%	L	H
<i>Betula sp.</i>	Birch	1	7	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	n/a	n/a
<i>Callitropsis nootkatensis</i> 'pendula'	Alaska cedar, weeping	8	7	25%	63%	13%	0%	0%	0%	100%	0%	0%	0%	0%	13%	L	H
<i>Callitropsis nootkatensis</i>	Alaska cedar	26	8	15%	73%	8%	4%	0%	0%	92%	8%	0%	0%	0%	4%	L	H
<i>Calocedrus decurrens</i>	Incense cedar	55	13	22%	15%	51%	9%	4%	2%	82%	15%	2%	0%	0%	2%	n/a	n/a
<i>Carpinus betulus</i>	European hornbeam	73	3	92%	4%	4%	0%	0%	36%	60%	4%	0%	0%	0%	1%	M	L-M
<i>Carpinus caroliniana</i>	American hornbeam	11	9	9%	73%	9%	9%	0%	0%	100%	0%	0%	0%	0%	9%	H	L
<i>Castanea dentata</i>	American chestnut	7	21	0%	29%	14%	14%	43%	0%	57%	43%	0%	0%	0%	14%	n/a	n/a
<i>Castanea sp.</i>	Chestnut	1	4	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	n/a	n/a
<i>Catalpa speciosa</i>	Western catalpa	1	13	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%	100%	M	M-H
<i>Cedrus atlantica</i>	Atlas cedar	6	25	0%	0%	17%	17%	67%	0%	100%	0%	0%	0%	0%	17%	n/a	n/a
<i>Cedrus atlantica</i> 'glauca'	Blue atlas cedar	11	15	0%	27%	45%	18%	9%	0%	100%	0%	0%	0%	0%	9%	n/a	n/a
<i>Cedrus deodara</i>	Deodar cedar	99	22	0%	8%	24%	28%	39%	0%	85%	12%	2%	1%	0%	1%	n/a	n/a
<i>Cercidiphyllum japonicum</i>	Katsuratree	35	8	23%	63%	11%	0%	3%	0%	69%	31%	0%	0%	0%	3%	L	H
<i>Cercis canadensis</i>	Eastern redbud	12	6	50%	33%	17%	0%	0%	0%	75%	25%	0%	0%	0%	8%	M	L-M
<i>Chamaecyparis lawsoniana</i>	Lawson falsecypress	65	17	3%	34%	18%	17%	28%	2%	57%	31%	3%	2%	6%	2%	M	M-H
<i>Chamaecyparis obtusa</i>	Hinoki falsecypress	22	7	27%	59%	14%	0%	0%	0%	91%	0%	5%	0%	5%	5%	L	H
<i>Chamaecyparis pisifera</i>	Sawara falsecypress	15	9	33%	40%	20%	7%	0%	0%	73%	27%	0%	0%	0%	7%	n/a	n/a
<i>Cornus florida</i>	Flowering dogwood	20	8	35%	45%	20%	0%	0%	0%	90%	10%	0%	0%	0%	5%	M	L-M
<i>Cornus kousa</i>	Kousa dogwood	66	6	61%	26%	14%	0%	0%	0%	92%	6%	0%	2%	0%	2%	H	M
<i>Cornus nuttallii</i>	Pacific dogwood	18	11	22%	33%	33%	6%	6%	0%	83%	6%	11%	0%	0%	6%	M	L-M
<i>Cornus sp.</i>	Ornamental dogwood	3	6	33%	67%	0%	0%	0%	0%	67%	33%	0%	0%	0%	33%	n/a	n/a
<i>Cornus</i> 'Eddie's White Wonder'	Eddie's white wonder dogwood	4	5	75%	25%	0%	0%	0%	0%	100%	0%	0%	0%	0%	25%	n/a	n/a
<i>Corylus cornuta</i>	Pacific dogwood	3	4	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	33%	n/a	n/a
<i>Crataegus douglasii</i>	Black hawthorn	12	5	92%	0%	0%	8%	0%	0%	100%	0%	0%	0%	0%	8%	n/a	n/a
<i>Crataegus monogyna</i>	Common hawthorn	49	8	37%	47%	6%	8%	2%	0%	71%	20%	4%	4%	0%	2%	M	M-H
<i>Cryptomeria japonica</i>	Japanese cedar	11	13	9%	27%	36%	18%	9%	0%	73%	18%	9%	0%	0%	9%	n/a	n/a

Species	Common Name	#T	MDBH	DC1	DC2	DC3	DC4	DC5	C1	C2	C3	C4	C5	C6	NM	ADPT	VULN
<i>Cupressus arizonica</i>	Arizona cypress	2	17	0%	0%	100%	0%	0%	0%	50%	50%	0%	0%	0%	50%	n/a	n/a
<i>Cupressus sp.</i>	Cypress species	46	9	61%	11%	17%	9%	2%	0%	87%	9%	4%	0%	0%	2%	n/a	n/a
<i>Fagus sylvatica</i>	European beech	7	13	0%	57%	14%	14%	14%	0%	29%	71%	0%	0%	0%	14%	M	M-H
<i>Fagus sylvatica 'purpurea'</i>	European beech (purple)	2	22	0%	0%	50%	0%	50%	50%	50%	0%	0%	0%	0%	50%	M	M-H
<i>Ficus carica</i>	Common fig	1	6	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	L	M
<i>Fraxinus americana</i>	White ash	56	8	9%	86%	5%	0%	0%	0%	82%	11%	4%	0%	4%	2%	L	M
<i>Fraxinus latifolia</i>	Oregon ash	46	7	48%	35%	11%	7%	0%	0%	63%	30%	7%	0%	0%	2%	M	M-H
<i>Fraxinus pennsylvanica</i>	Green ash	106	8	22%	73%	6%	0%	0%	0%	70%	27%	2%	0%	1%	1%	M	L-M
<i>Fraxinus sp.</i>	Ash species	45	7	42%	47%	11%	0%	0%	0%	71%	11%	16%	2%	0%	2%	n/a	n/a
<i>Ginkgo biloba</i>	Ginkgo	33	4	76%	24%	0%	0%	0%	0%	61%	33%	0%	3%	3%	3%	H	M
<i>Gleditsia triacanthos</i>	Honeylocust	38	7	45%	32%	24%	0%	0%	0%	95%	3%	3%	0%	0%	3%	M	M-H
<i>Hesperotropis leylandii</i>	Leyland cypress	79	11	27%	35%	24%	8%	6%	0%	97%	3%	0%	0%	0%	1%	n/a	n/a
<i>Ilex aquifolium</i>	English holly	89	8	24%	72%	4%	0%	0%	0%	93%	6%	1%	0%	0%	1%	M	L-M
<i>Juglans regia</i>	English walnut	4	21	25%	25%	0%	0%	50%	0%	75%	25%	0%	0%	0%	25%	M	M-H
<i>Juglans sp.</i>	Walnut species	1	4	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%	n/a	n/a
<i>Juniperus chinensis 'Torulosa'</i>	Hollywood juniper	1	4	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	H	L
<i>Juniperus sp.</i>	Juniper species	20	9	40%	35%	15%	10%	0%	0%	65%	35%	0%	0%	0%	5%	n/a	n/a
<i>Laburnum anagyroides</i>	Common goldenchain tree	11	7	73%	0%	18%	9%	0%	0%	73%	18%	9%	0%	0%	9%	L	H
<i>Laburnum x watereri</i>	Goldenchain tree	1	20	0%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	100%	n/a	n/a
<i>Lagerstroemia sp.</i>	Crape myrtle	5	3	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	20%	H	L
<i>Larix decidua</i>	European larch	1	28	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%	0%	100%	M	M-H
<i>Liquidambar styraciflua</i>	American sweetgum	125	14	6%	18%	59%	11%	6%	0%	82%	15%	2%	0%	1%	1%	L	M
<i>Liriodendron tulipifera</i>	Tuliptree	16	10	31%	44%	19%	0%	6%	0%	88%	6%	0%	6%	0%	6%	L	H
<i>Magnolia grandiflora</i>	Southern magnolia	3	9	67%	0%	0%	33%	0%	0%	100%	0%	0%	0%	0%	33%	M	L-M
<i>Magnolia sp.</i>	Magnolia species	6	6	50%	50%	0%	0%	0%	0%	33%	17%	50%	0%	0%	17%	n/a	n/a
<i>Magnolia stellata</i>	Star magnolia	30	6	60%	37%	3%	0%	0%	0%	97%	0%	3%	0%	0%	3%	n/a	n/a
<i>Magnolia x soulangeana</i>	Saucer magnolia	3	7	33%	67%	0%	0%	0%	0%	100%	0%	0%	0%	0%	33%	n/a	n/a
<i>Malus domestica</i>	Apple	9	10	22%	33%	33%	11%	0%	0%	44%	56%	0%	0%	0%	11%	M	M-H
<i>Malus sp. &lt;flowering&gt;</i>	Apple	111	6	65%	29%	6%	0%	0%	0%	79%	18%	2%	1%	0%	1%	M	M-H
<i>Malus sp. &lt;cultivated&gt;</i>	Apple	26	9	23%	58%	15%	4%	0%	0%	92%	8%	0%	0%	0%	4%	M	M-H
<i>Nyssa sylvatica</i>	Black tupelo	12	3	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	8%	H	L
<i>Ostrya virginiana</i>	Hop hornbeam	33	4	85%	15%	0%	0%	0%	0%	91%	9%	0%	0%	0%	3%	H	L
<i>Parrotia persica</i>	Persian ironwood	164	3	88%	12%	0%	0%	0%	16%	76%	7%	0%	1%	0%	1%	H	M
<i>Picea abies</i>	Norway spruce	10	13	10%	30%	40%	20%	0%	0%	50%	20%	30%	0%	0%	10%	M	M-H
<i>Picea glauca 'Pendula'</i>	Colorado blue spruce	3	16	0%	0%	100%	0%	0%	0%	0%	0%	33%	0%	67%	33%	M	M-H
<i>Picea pungens</i>	Colorado blue spruce	32	14	3%	38%	38%	13%	9%	0%	63%	28%	6%	3%	0%	3%	M	M-H
<i>Picea pungens var. glauca</i>	Colorado blue spruce	44	14	9%	16%	59%	16%	0%	0%	89%	5%	7%	0%	0%	2%	M	M-H
<i>Picea sitchensis</i>	Sitka spruce	14	19	0%	0%	36%	43%	21%	0%	71%	29%	0%	0%	0%	7%	n/a	n/a
<i>Picea sp.</i>	Spruce species	1	3	100%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%	n/a	n/a
<i>Pinus contorta</i>	Shore pine	133	12	10%	42%	35%	11%	2%	2%	59%	29%	6%	0%	4%	1%	H	n/a
<i>Pinus monticola</i>	Western white pine	19	11	53%	5%	11%	21%	11%	0%	84%	11%	0%	0%	5%	5%	n/a	n/a
<i>Pinus nigra</i>	Austrian pine	129	15	2%	24%	50%	16%	9%	0%	81%	16%	2%	1%	0%	1%	M	M-H
<i>Pinus ponderosa</i>	Ponderosa pine	10	24	10%	0%	10%	40%	40%	10%	90%	0%	0%	0%	0%	10%	L	H
<i>Pinus sp.</i>	Unknown Pine	13	8	15%	77%	8%	0%	0%	0%	23%	69%	8%	0%	0%	8%	n/a	n/a
<i>Pinus sp. &lt;2 needle&gt;</i>	Unknown Pine	31	5	77%	23%	0%	0%	0%	0%	100%	0%	0%	0%	0%	3%	n/a	n/a
<i>Pinus strobus</i>	Eastern white pine	4	19	25%	0%	0%	50%	25%	0%	75%	0%	0%	25%	0%	25%	L	H
<i>Pinus sylvestris</i>	Scots pine	65	15	3%	34%	31%	20%	12%	0%	60%	35%	2%	0%	3%	2%	M	M-H
<i>Pinus thunbergii</i>	Japanese black pine	1	8	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	n/a	n/a
<i>Platanus x acerifolia</i>	London planetree	56	13	25%	38%	4%	18%	16%	0%	80%	18%	0%	0%	2%	2%	n/a	n/a
<i>Platanus occidentalis</i>	American sycamore	10	17	0%	0%	60%	30%	10%	0%	100%	0%	0%	0%	0%	10%	M	L-M
<i>Populus alba</i>	White poplar	8	11	50%	25%	0%	0%	25%	0%	63%	38%	0%	0%	0%	13%	M	L-M
<i>Populus balsamifera</i>	Black cottonwood	9	21	22%	22%	0%	0%	56%	0%	100%	0%	0%	0%	0%	11%	n/a	n/a
<i>Populus nigra 'Italica'</i>	Lombardy poplar	18	33	11%	6%	0%	17%	67%	11%	67%	11%	11%	0%	0%	6%	n/a	L-M
<i>Populus tremuloides</i>	Quaking aspen	52	11	19%	37%	27%	15%	2%	0%	94%	2%	4%	0%	0%	2%	M	L-M
<i>Populus trichocarpa</i>	Black cottonwood	71	15	18%	30%	11%	18%	23%	3%	82%	7%	3%	1%	4%	1%	n/a	n/a
<i>Prunus avium &lt;cultivated&gt;</i>	Sweet cherry	125	10	27%	46%	10%	10%	6%	0%	73%	26%	1%	0%	0%	1%	M	M-H
<i>Prunus avium &lt;wild&gt;</i>	Sweet cherry	78	7	54%	32%	10%	3%	1%	0%	76%	21%	4%	0%	0%	1%	M	M-H
<i>Prunus cerasifera</i>	Cherry plum	35	12	3%	51%	34%	9%	3%	0%	83%	17%	0%	0%	0%	3%	M	L-M

Species	Common Name	#T	MDBH	DC1	DC2	DC3	DC4	DC5	C1	C2	C3	C4	C5	C6	NM	ADPT	VULN
<i>Prunus cerasifera</i> 'thundercloud'	Flowering plum	496	11	13%	47%	32%	7%	1%	1%	52%	41%	5%	0%	1%	0%	M	L-M
<i>Prunus domestica</i>	Sweet cherry	1	15	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	100%	M	L-M
<i>Prunus emarginata</i>	Bitter cherry	32	7	50%	31%	9%	9%	0%	0%	78%	16%	0%	0%	6%	3%	n/a	n/a
<i>Prunus laurocerasus</i>	Cherry laurel	47	7	53%	36%	9%	2%	0%	0%	74%	26%	0%	0%	0%	2%	M	L-M
<i>Prunus lusitanica</i>	Portuguese laurel	5	6	60%	40%	0%	0%	0%	0%	20%	80%	0%	0%	0%	20%	n/a	n/a
<i>Prunus persica</i>	Peach	3	13	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%	33%	M	L-M
<i>Prunus serrulata</i>	Japanese flowering cherry	183	14	7%	28%	40%	16%	9%	1%	49%	37%	13%	1%	0%	1%	M	M-H
<i>Prunus sp.</i>	Cherry species	49	9	33%	43%	14%	10%	0%	0%	82%	16%	2%	0%	0%	2%	n/a	n/a
<i>Prunus sp.</i> <flowering cherry>	Flowering plum	10	11	10%	50%	30%	10%	0%	0%	50%	30%	10%	10%	0%	10%	n/a	n/a
<i>Prunus sp.</i> <fruiting cherry>	Fruiting cherry	3	12	0%	33%	67%	0%	0%	0%	100%	0%	0%	0%	0%	33%	n/a	n/a
<i>Pseudotsuga menziesii</i>	Douglas-fir	3561	21	6%	15%	21%	21%	37%	1%	70%	25%	3%	0%	1%	0%	M	H
<i>Pyrus calleryana</i>	Callery pear	173	6	48%	49%	2%	2%	0%	0%	57%	42%	1%	0%	0%	1%	M	L-M
<i>Pyrus communis</i>	Common pear	8	7	13%	88%	0%	0%	0%	0%	100%	0%	0%	0%	0%	13%	M	L-M
<i>Pyrus domestica</i>	Pear tree	3	3	67%	33%	0%	0%	0%	0%	67%	33%	0%	0%	0%	33%	n/a	n/a
<i>Pyrus sp.</i>	Pear tree	4	9	0%	75%	25%	0%	0%	0%	100%	0%	0%	0%	0%	25%	n/a	n/a
<i>Quercus alba</i>	White oak	32	7	59%	25%	16%	0%	0%	0%	38%	63%	0%	0%	0%	3%	L	M
<i>Quercus garryana</i>	Oregon white oak	1314	20	6%	17%	22%	24%	32%	0%	85%	13%	0%	0%	0%	0%	M	L-M
<i>Quercus palustris</i>	Pin oak	79	11	27%	18%	47%	4%	5%	8%	71%	15%	6%	0%	0%	1%	M	M-H
<i>Quercus robur</i>	English oak	37	15	0%	49%	35%	3%	14%	0%	16%	22%	62%	0%	0%	3%	M	M-H
<i>Quercus rubra</i>	Red oak	134	19	4%	10%	31%	28%	26%	0%	89%	10%	1%	0%	0%	1%	M	M-H
<i>Rhus glabra</i>	Smooth sumac	1	4	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	n/a	n/a
<i>Robinia pseudoacacia</i>	Black locust	100	12	20%	42%	14%	7%	17%	0%	79%	16%	4%	0%	1%	1%	M	M-H
<i>Salix babylonica</i>	Weeping willow	1	10	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	n/a	n/a
<i>Salix matsudana</i> 'Tortuosa'	Corkscrew willow	3	18	0%	0%	67%	33%	0%	0%	0%	67%	33%	0%	0%	33%	n/a	n/a
<i>Salix scouleriana</i>	Scouler's willow	11	12	36%	18%	18%	27%	0%	0%	55%	45%	0%	0%	0%	9%	n/a	n/a
<i>Salix sitchensis</i>	Sitka willow	1	6	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	n/a	n/a
<i>Salix sp.</i>	Willow species	2	16	0%	50%	0%	50%	0%	0%	100%	0%	0%	0%	0%	50%	n/a	n/a
<i>Sciadopitys verticillata</i>	Umbrella pine	3	3	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	33%	n/a	n/a
<i>Sequoia sempervirens</i>	Coastal redwood	12	25	0%	17%	17%	25%	42%	0%	83%	17%	0%	0%	0%	8%	L	M
<i>Sequoiadendron giganteum</i>	Giant sequoia	3	23	33%	0%	0%	0%	67%	0%	67%	33%	0%	0%	0%	33%	M	M
<i>Sequoiadendron giganteum</i> 'Pendulum'	Giant sequoia	5	6	40%	60%	0%	0%	0%	0%	100%	0%	0%	0%	0%	20%	M	M
<i>Sorbus aucuparia</i>	European mountain ash	112	7	44%	43%	12%	2%	0%	1%	52%	38%	5%	1%	4%	1%	M	M-H
<i>Styrax japonicus</i>	Japanese snowbell	49	5	65%	35%	0%	0%	0%	0%	82%	12%	6%	0%	0%	2%	M	M-H
<i>Syringa vulgaris</i>	Common lilac	11	2	100%	0%	0%	0%	0%	0%	45%	55%	0%	0%	0%	9%	M	M-H
<i>Taxus baccata</i>	English yew	2	12	0%	50%	50%	0%	0%	0%	100%	0%	0%	0%	0%	50%	n/a	n/a
<i>Taxus brevifolia</i>	Pacific yew	29	14	0%	41%	41%	14%	3%	0%	17%	21%	17%	31%	14%	3%	n/a	n/a
<i>Thuja occidentalis</i>	Eastern arborvitae	137	5	80%	18%	1%	1%	0%	0%	66%	26%	0%	0%	8%	1%	H	M
<i>Thuja plicata</i>	Western red cedar	128	15	12%	37%	16%	10%	25%	2%	61%	24%	6%	2%	5%	1%	H	L
<i>Tilia cordata</i>	Littleleaf linden	56	10	7%	86%	2%	4%	2%	0%	91%	7%	0%	0%	2%	2%	H	M
<i>Trachycarpus fortunei</i>	Chinese windmill palm	7	6	43%	57%	0%	0%	0%	0%	43%	57%	0%	0%	0%	14%	n/a	n/a
<i>Tsuga heterophylla</i>	Western hemlock	25	20	0%	8%	36%	32%	24%	0%	32%	40%	0%	4%	24%	4%	L	M-H
<i>Tsuga mertensiana</i>	Douglas-fir	4	9	25%	50%	25%	0%	0%	0%	100%	0%	0%	0%	0%	25%	M	M-H
<i>Ulmus americana</i>	American elm	2	27	0%	0%	0%	50%	50%	0%	0%	50%	50%	0%	0%	50%	M	L-M
<i>Ulmus pumila</i>	Siberian elm	5	18	20%	20%	0%	20%	40%	0%	80%	20%	0%	0%	0%	20%	M	L-M
<i>Ulmus sp.</i>	Elm tree (species unknown)	53	4	81%	19%	0%	0%	0%	0%	94%	6%	0%	0%	0%	2%	n/a	n/a
<i>Viburnum sp.</i>	Viburnum	2	19	0%	0%	0%	100%	0%	0%	100%	0%	0%	0%	0%	50%	n/a	n/a
<i>Zelkova serrata</i>	Japanese zelkova	69	6	52%	48%	0%	0%	0%	0%	62%	35%	0%	0%	3%	1%	H	M

**Abbreviation Key**

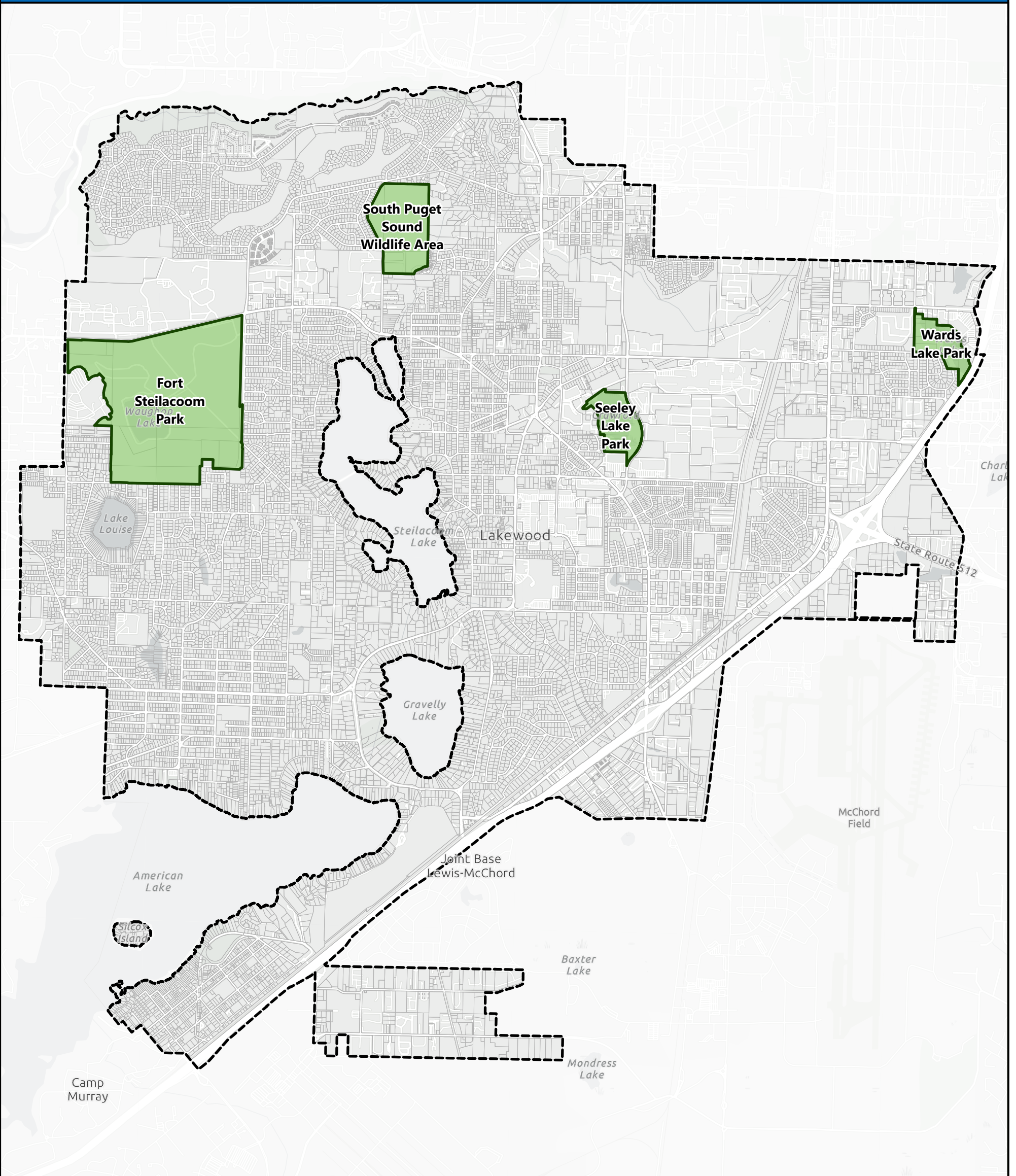
DC1: DBH category 1, 0-6 inches  
DC2: DBH category 2, 6-12 inches  
DC3: DBH category 3, 12-18 inches  
DC4: DBH category 4, 18-24 inches  
DC5: CBH category 5, >24 inches

C1: Condition rating category 1, excellent  
C2: Condition rating category 2, good  
C3: Condition rating category 3, fair  
C4: Condition rating category 4, poor  
C5: Condition rating category 5, very poor

#T: Number of trees  
MDBH: Mean DBH

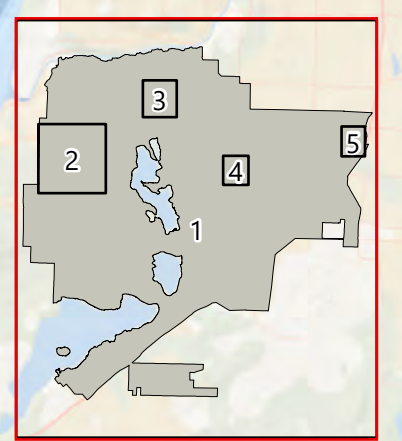
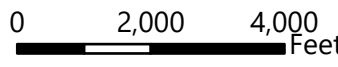
VULN: Tree species vulnerability ranking per Rutledge and Brandt (2022).  
ADPT: Tree species adaptability ranking per Rutledge, A. and Brandt, L.A. (2022). Puget Sound Region: Tree Species Vulnerability Assessment. Summary Report from the Northern Institute of Applied Climate Science (NIACS). White Paper. Houghton, MI: U.S. Department of Agriculture, Northern Forests Climate Hub.

LAKWOOD FLAT - OVERVIEW



LAKWOOD APPENDIX MAPS

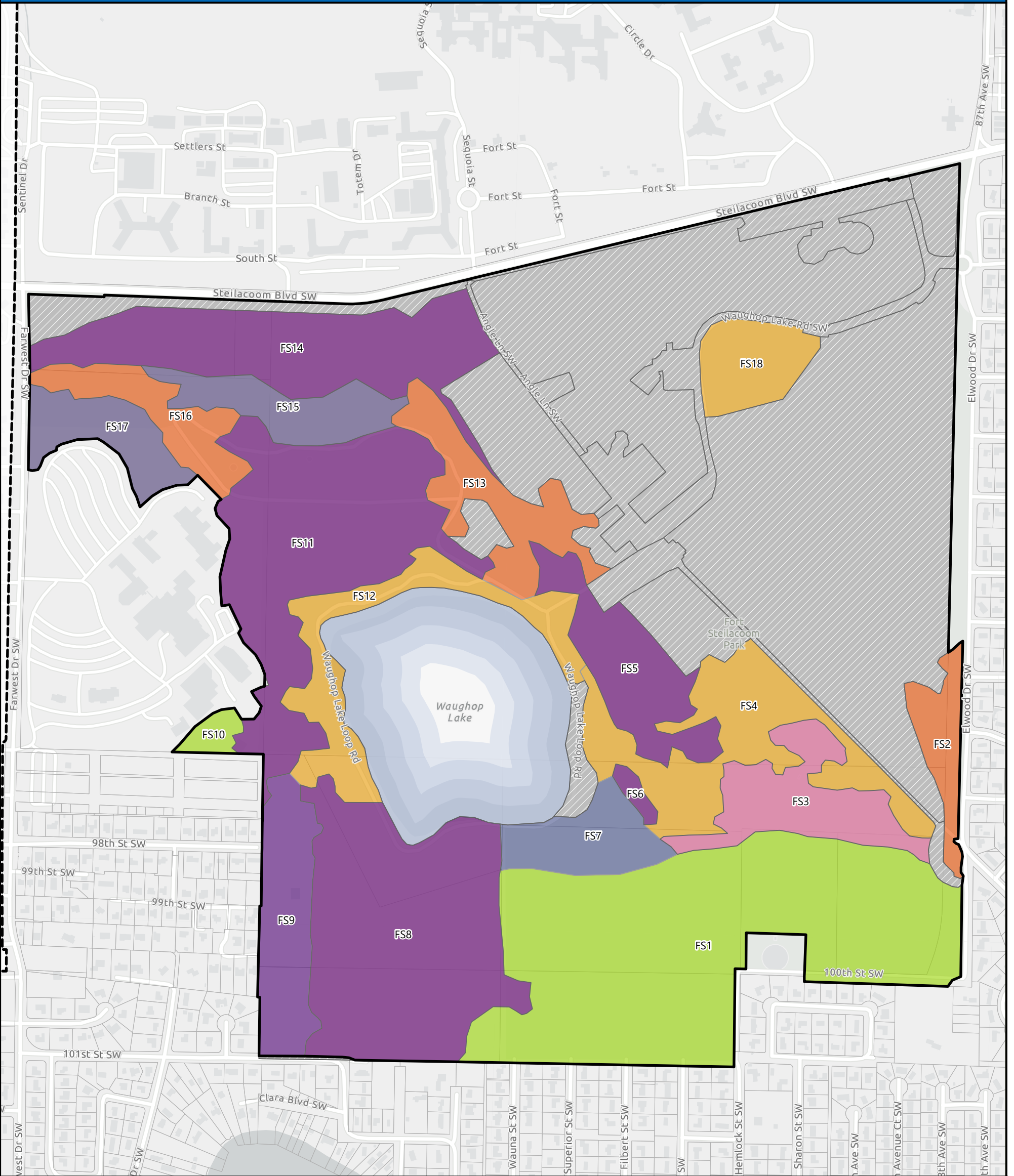
- LAYERS
- City Boundary
  - FLAT Sites
  - Parcels



Print Date: 12/18/2024



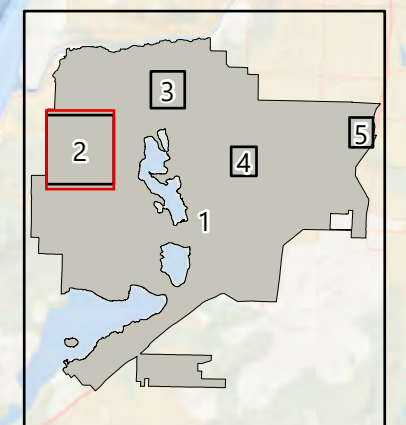
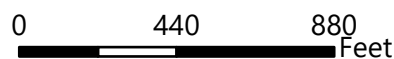
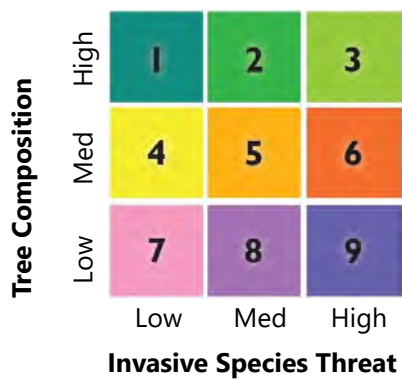
# LAKWOOD FLAT - FORT STEILACOOM PARK



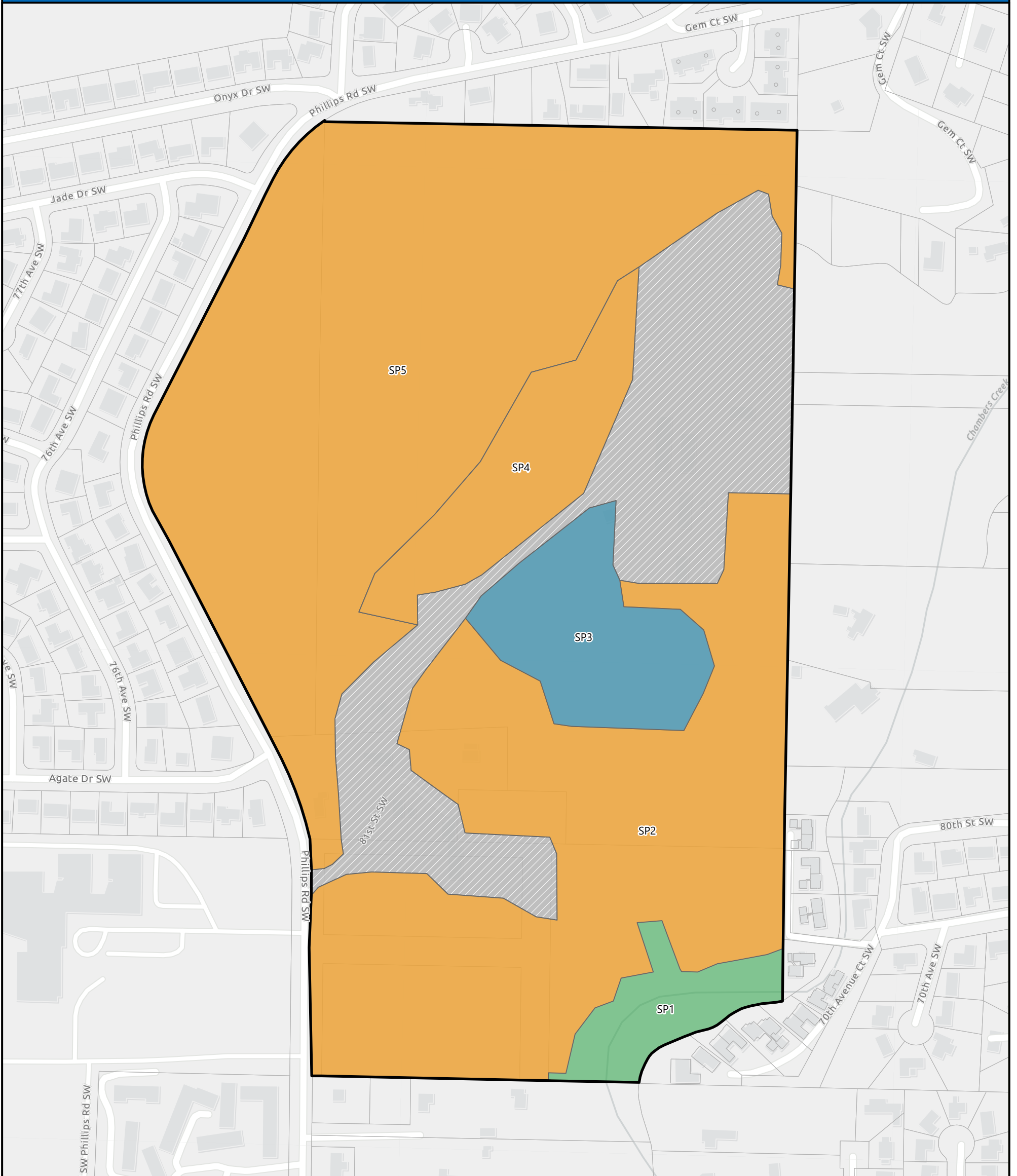
## LAKWOOD APPENDIX MAPS

### LAYERS

- City Boundary
- Hardscaped or Landscaped
- Natural Area, < 25% Forest Canopy
- Open Water
- Parcels








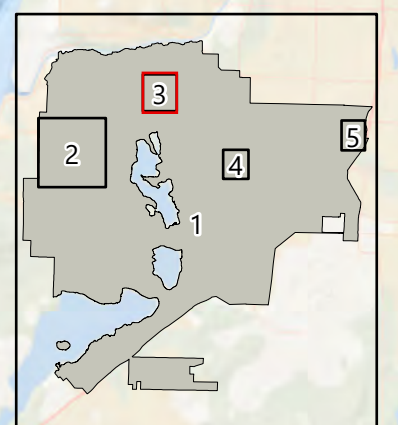
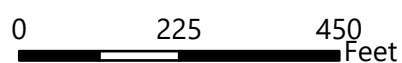
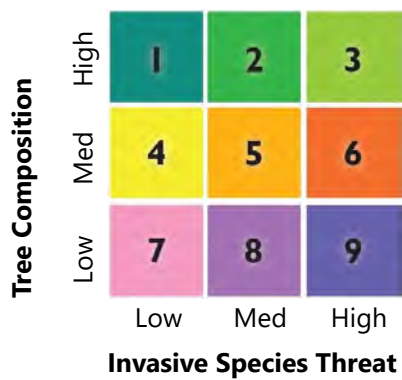
# LAKWOOD FLAT - SOUTH PUGET SOUND WILDLIFE AREA



## LAKWOOD APPENDIX MAPS

### LAYERS

-  City Boundary
-  Hardscaped or Landscaped
-  Natural Area, < 25% Forest Canopy
-  Open Water
-  Parcels

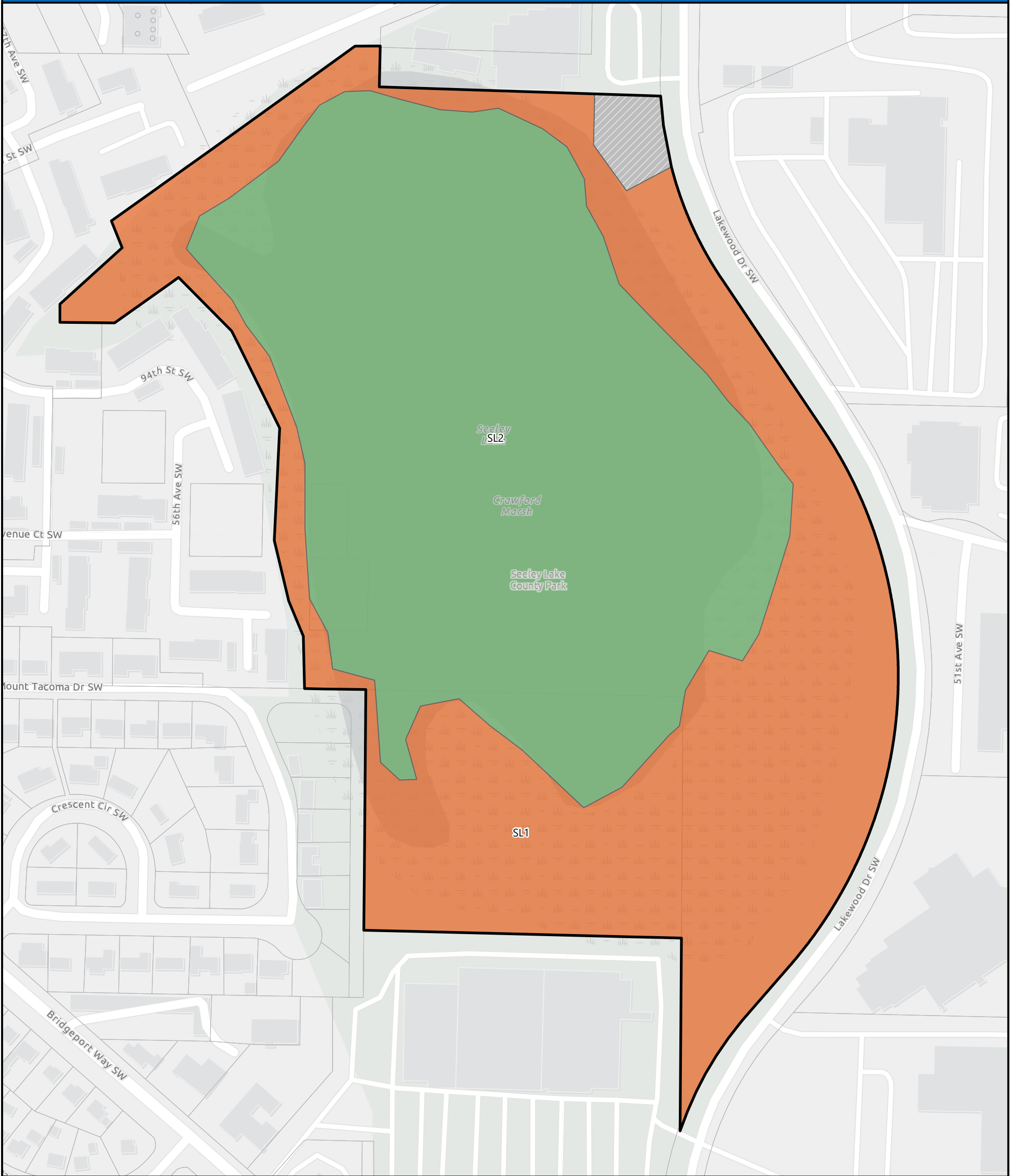


Print Date: 12/18/2024





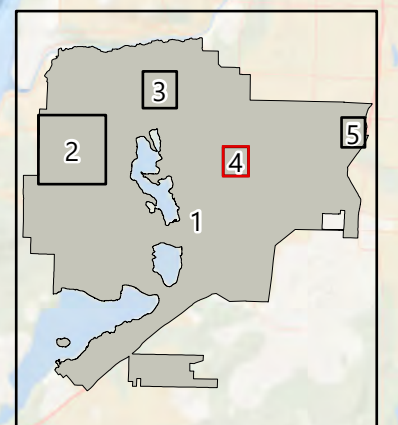
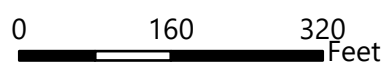
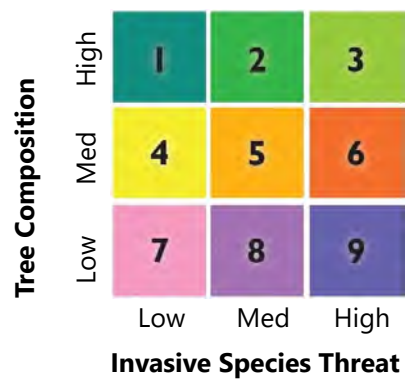
# LAKEWOOD FLAT - SEELEY LAKE COUNTY PARK



## LAKEWOOD APPENDIX MAPS

### LAYERS

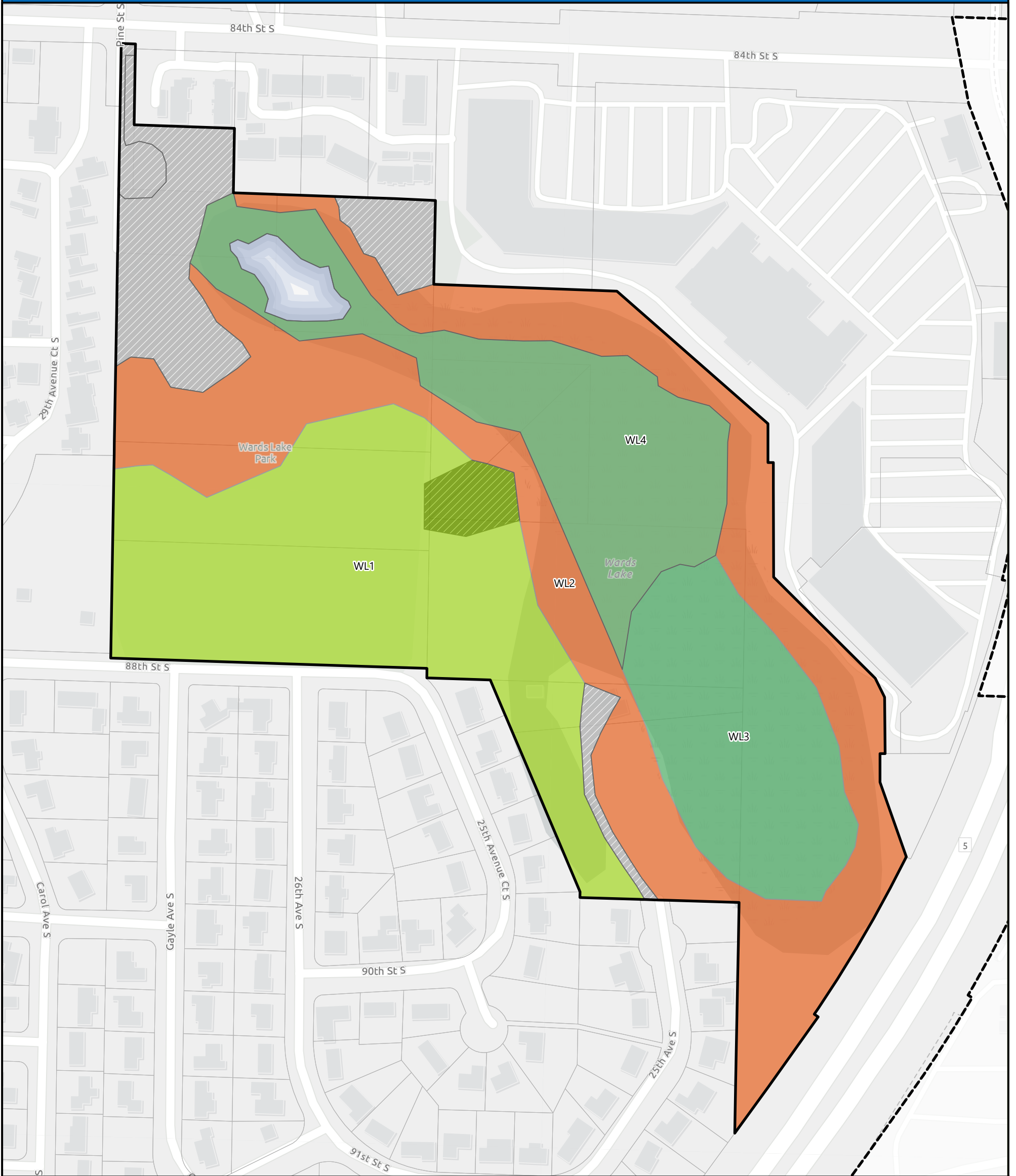
- City Boundary
- Hardscaped or Landscaped
- Natural Area, < 25% Forest Canopy
- Open Water
- Parcels



Print Date: 12/18/2024



# LAKWOOD FLAT - WARDS LAKE PARK

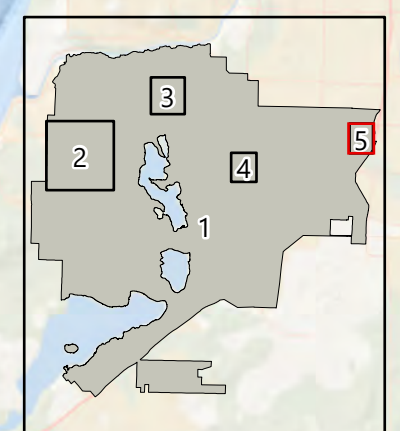
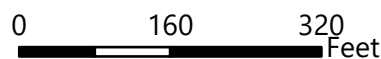
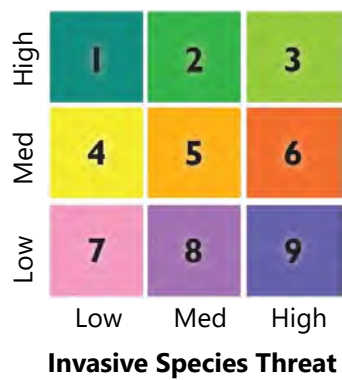


## LAKWOOD APPENDIX MAPS

### LAYERS

- City Boundary
- Hardscaped or Landscaped
- Natural Area, < 25% Forest Canopy
- Open Water
- Parcels

### Tree Composition



Print Date: 12/18/2024



# APPENDIX G. Tree Inventory Asset Management Consultation Memorandum

## TECHNICAL MEMORANDUM

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Date:	November 20, 2024
To:	Tiffany Speir, Planning Manager
Cc:	Jeff Rimack, Planning & Public Works Director Mary Dodsworth, Parks, Recreation & Community Services Director
From:	Deb Powers, Senior Arborist Kim Frappier, Senior Urban Forester/Environmental Planner
Project Name:	City of Lakewood 2024 Tree Inventory
Facet Number:	2403.0418

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### Task 4: Asset Management Software Consultation

Within the urban forest, public trees function as green infrastructure assets that provide a wide range of community benefits. Yet unlike most infrastructure assets, the value of trees appreciates over time. This is further justification to measure and proactively manage public trees for optimal condition and longevity, and to minimize risk to property and people. Urban forests are measured in several ways by (1) assessing the entire population (e.g., the outline of tree canopy cover, as seen from above), (2) by forest stands, or (3) by conducting an individual tree inventory (e.g., trees within public rights-of-way or developed parks). These data can then be analyzed and tracked to inform long-term management decisions or support the day-to-day maintenance of public trees.

This purpose of this technical memorandum is to:

- Document how the City is currently managing its public tree assets.
- Provide an overview of different asset management strategies including how software can be used, variables to consider, and the long-term benefits of tracking specific tree attributes.
- Introduce software options for the City's review prior to engaging with vendors.

#### What is Tree Asset Management?

Many jurisdictions integrate their public individual tree data directly into a maintenance management system (MMS) such as Hansen, CityWorks, or PubWorks, developed to manage infrastructure assets such as light posts, fire hydrants, or sidewalks. However, unlike static assets, trees are dynamic biological organisms with attributes that change over time, such as health and condition, trunk diameter, and canopy spread. The maintenance status and needs of the tree are also tracked within the MMS and may include specific maintenance tasks such as clearance pruning, planting needed, stump removal, and removal of the tree. Some tree management software programs have been specifically

designed to efficiently record and track these changes with other features, such as distributing workloads and strategically prioritizing tree pruning, removal, inspections, and other activities to meet certain management objectives. Many tree software systems interface with ESRI/GIS maps and can integrate with existing municipal maintenance management systems like Cityworks, customer service systems such as 311, and even social media platforms.

## Project Background

The City of Lakewood seeks to develop a municipal urban forestry program to ensure a sustainable and resilient urban forest canopy into the future. In June 2024, the City launched the first phase of this effort - a City-wide urban forestry study of both public and private trees, using three data collection methodologies:

1. Individual tree assessment. Specific attributes such as genus and species, DBH (trunk diameter measured at 54 inches above grade), condition, etc. were collected through a “boots-on-the-ground” inventory of individual trees in these locations:
  - o City-owned and managed public rights-of-way (ROW)
  - o City-owned and managed parks
  - o Select public institutional grounds (hospital and campus properties)
  - o The Lakewood Clear Zone for the JBLM North McChord Field
2. Forest stand assessment. Forest Landscape Assessment Tool (FLAT) methodology is a stand management approach utilized for large acreage wooded sites. FLAT is a rapid ecological assessment technique used to characterize forest canopy and understory conditions, looking at forest health indicators and levels of invasive species threats. Facet assessed forest stands in Ward Lake, Fort Steilacoom, and Seeley Lake Parks.
3. Tree canopy cover/LiDAR Assessment. Baseline information on private properties where landowner permissions could not be obtained and where individual tree assessment is not cost-effective was needed. Facet collected tree canopy cover data for specific large-acreage properties and census tracts identified in the 2022 tree canopy cover assessment, such as Lakewood Gardens and Tacoma Golf & Country Club. This assessment uses aerial imagery to assess tree canopy cover in given areas. When compared to other land cover areas (impervious surfaces, turf/meadow, water, etc.), this data provides a snapshot of the degree of tree canopy coverage as viewed from above.

This data will become a foundational component of the City’s Urban Forestry Management Plan scheduled for development in 2025. In addition to collecting and analyzing the above-referenced data, this tree inventory project seeks to understand how the City can utilize this data to improve the management and maintenance of publicly owned and managed trees. To that end, Facet is providing consultation services to assist the City in considering how tree data can be utilized City-wide and within each division or workgroup, facilitate awareness of tree data needs across divisions, and

introduce tree inventory software system features that may enhance each division's tree management efforts.

## Work Session

Facet facilitated a staff work session on October 23, 2024, to gain an understanding of Lakewood's current tree asset management approach, its current staff and program capacity, any data management and work order needs, and the desired public tree maintenance and programmatic goals. To solicit information on the current and anticipated tree management needs, Facet developed questions that would prompt participant discussion in four general categories:

- Public tree management
- Staffing
- Funding/budget
- Current asset management tools

The City of Lakewood 2024 Tree Inventory Project Manager reviewed and approved the specific questions prior to the work session (Attachment A).

## Participants

Staff were selected to represent all divisions responsible for trees in some capacity and would reflect both management and maintenance perspectives. Departments that were represented include Planning and Public Works (recently combined in Lakewood) and Parks. Staff positions include directors, managers, and superintendent levels, with roles in capital improvement project management, long-range planning, permitting, development review, code administration, policy/code development, contractor oversight, operations, and maintenance. Facet's Kim Frappier and Deb Powers facilitated the work session. Participants included:

- Tiffany Speir, Planning Manager; 2024 Tree Inventory Project Manager
- Mary Dodsworth, Parks Director
- Jeff Rimack, Director of Planning & Public Works
- Troy Pokswinski, Planning & Public Works Capital Projects Manager
- Weston Ott, City Engineer
- Angie Silva, Assistant Director of Planning & Public Works
- David de la Cruz, Parks Development Project Manager
- Scott Williams, Parks and ROW Maintenance Superintendent

It was noted that field staff responsible for public tree care were not represented in the work session. The City Project Manager arranged for field staff to submit a completed questionnaire later, which has been included in the responses below.

## Work Session Outcomes

At the onset of the work session, Facet asked participants to describe what role they have in urban forest management and what they hope to use the tree inventory data for, providing examples like “track ongoing tree health,” “track planting activities,” “prioritize maintenance needs,” or “provide daily work orders.” Although participants had specific focus areas in mind at the beginning of the work session, the group became engaged and interested in managing trees for a broad range of objectives through the 1.5-hour session. The following responses were derived from the questions but also resulted from the organic discussions related to the four categories below.

### PUBLIC TREE MANAGEMENT: WHAT ARE YOUR OBJECTIVES?

Participants stated that their needs for tree data related to management or programmatic issues rather than day-to-day asset maintenance. Staff identified the need for both canopy cover data, as well as individual tree assessment data for various reasons:

- Canopy cover data is important to support/track progress towards a City-wide canopy cover goal to support climate change, housing policy, and private property regulatory issues. Canopy cover may help to manage “other” trees – presumed on private property – that obstruct street trees. Park staff expressed the need to understand how park tree canopy cover can be described in the the Parks Legacy Plan.
- Individual tree assessment data is needed for general asset maintenance/management, to run data queries, to track planting/removal of ROW trees, to better manage ROW permits, and for any work, including construction in the ROW. Individual tree data is also needed to
  - Improve transfer of responsibilities between Operations and Maintenance.
  - Better manage public trees for species diversity, age distribution, condition and health of tree stands.
  - Shift from a mostly response-driven approach using the 311 customer service system to a more proactive, strategic management approach.

When asked which trees staff are currently managing, the responses reflect the departments represented in the work session: Planning and Public Works and Parks.

### STAFF: WHAT IS CURRENT CAPACITY?

City staff were asked to describe their current operations (e.g., the process of how crews are assigned and accomplish tasks) and questions related to public tree maintenance and management of inventory data. Staff responsible for tree maintenance disclosed that there has been little proactive management since 2002, and that tree planting, minor operations, and high-priority tasks are done on a more response-driven model. That approach didn’t allow for preventative maintenance, opportunistic improvements, and permit/plan review related to removal, pruning, and planting requests. Examples – provided included:

- Pruning is usually generated from the 311 system, an annual work plan for street trees, and a school-generated work plan for bus clearance. Pruning is proactive only on an as-needed, project-by-project basis. No proactive corridor pruning or regular monitoring takes place.
- Tree removals are usually related to an accident response, when trees are damaged and cut to a stump when scheduled. Stump removals occur twice per year when they have a plethora of stumps. The resulting available spaces are not on a replanting schedule.
- There is no active plan for tree replacements/replanting for park and street trees.
- Contractors or a third-party arborist are brought in for major operations as needed to offset the staff of four that are responsible for maintaining all ROW and park trees (in addition to other duties such as roadside mowing).
- There is an ISA-Certified Arborist on Parks staff, who is utilized for minor tree risk assessments and to perform park tree maintenance.

## FUNDING/BUDGET CONSIDERATIONS

When asked if funding or other resources had been established for tree inventory software acquisition, participants responded that the urban forestry program has yet to launch and that funding decisions were deferred to a later date, after a baseline had been established for what their needs are and who will maintain the data.

## CURRENT ASSET MANAGEMENT TOOLS

The City currently utilizes StreetSaver MMS combined with an ESRI-based GIS system and Excel spreadsheets to keep track of tree assets. Currently, Parks and Public Works field staff update existing tree data, but it hasn't been formally acknowledged who will maintain the new tree data collected as part of the 2024 tree study. A more focused, long-term discussion is needed about asset management tools. The City's current permit database system is the PALS system (Pierce County) but will be changed to Camino by July 2025.

The City is currently using the following tools to track on-the-ground maintenance needs:

- Field Maps Collector to update tree inventory data which can be accessed on mobile devices.
- An in-house ArcGIS module to track locations and other data. An IT program spearheads this.
- Spreadsheets with limited data fields, which are not used to assign work, establish priorities, analyze trends, etc.
- The 311 customer service platform, which is being used as a work order system and set time frames for completing work tasks.

## Future Software Needs

City staff stated that the tree asset management software is needed to facilitate the shift from reactive to proactive management using priority levels and work schedules by area or ROW corridors. It was

noted that software functionality should also inform contractors' work and help to establish levels of service for budgeting purposes. It was mentioned that a prior tree assessment provided a 5-year plan to spread out work based on priorities that distinguished immediate needs from the operations that could be distributed over near and longer-term periods, which would be automated by software.

Staff identified the following priority software features considered high priority to meet key maintenance and management objectives:

- Tree attributes that are easily accessible (in the field) and could be manipulated for queries and reporting purposes including tree species, DBH, health/condition, heritage tree status, and planting date.
- Capability of easily using the same data to manage assets for species diversity, age distribution, and other objectives.
- Daily work orders for ROW and formally landscaped park area trees (but not open space forested areas) that relate to a strategic planning approach, such as pruning cycle/corridor pruning, seasonal tree planting, ensuring equitable distribution of public tree care throughout the City, etc. versus a reactionary "putting out fires" approach.
- Scheduled, proactive monitoring to prevent tree failure due to pests/disease infestation, abundance of poor condition/senescent/hazard trees, accidental damage resulting from inadequate clearances, etc.
- Capability to easily provide the public and decision-makers a better understanding of the urban forest, specific trees (e.g. Heritage Trees), or service level/budget concerns.

Some additional features identified by staff that could be useful software functions include:

- Use of data to quantify ecosystem services or other benefits (iTree tools).
- Capability to reference files (or interface with a City database) to easily obtain information such as arborist reports related to individual inventoried public trees.
- Set up reminders triggered by date or certain actions, such as "monitor" or "require arborist report".
- Show potential conflicts or impacts to other infrastructure elements, such as local utilities (overhead or underground), pathways, etc.
- Integrate with customer service reporting platforms that generates work orders, such as the current Lakewood 311 in use, or other municipality's "See, Click, Fix" system so work requests overlay with tree data and mapping information.

## Linking Tree Attributes to a Healthy Urban Forest

Often, the technology selected to streamline municipal processes may not deliver the same features or functions as expected. The resulting platform may be unsuitable for the primary users, or the features may not have been carefully considered for all users and audiences or to remain relevant in its future



use. To guide decisions in selecting tree inventory software options, the following attributes are considered key performance indicators of a healthy, resilient urban forest (Clark et al 1997) that remain relevant today as criteria for managing public trees. Most of these have already been identified by staff as management objectives or desired software features. When weighing the different needs identified by staff herein with software costs, Facet recommends the City keep the following performance indicators at the forefront for decisions related to software acquisition.

- **Accessible canopy cover data.** Benefit: baseline canopy data can optimize the coordination of development services, improve internal efficiency, and serve as a tool for public outreach.
- **Current canopy cover data.** Benefit: tracked over time and compared to canopy cover policy goals, is an indicator of acceptable levels of environmental health and liveability balanced with growth and development.
- **Public tree inventory.** Benefit: proactively manage public trees and monitor service levels, develop work plans appropriately, and justify funding needs. Quantify assets, risks, and liabilities. Plan proactive tree management strategies and distribute workloads efficiently. Lower public tree maintenance costs.
- **Uneven tree age distribution** (a balance of large and small DBH trees). Benefit: facilitates long-term budget forecasting. Annual costs for the care of public trees can be more evenly distributed over many years. A varied age-class distribution is important for optimizing environmental benefits and results in a healthier, more resilient and sustainable urban forest.
- **Species suitability.** Benefit: informs tree planting and removal strategies that reduce tree maintenance and removal costs.
- **Species diversity.** Benefit: Healthier, resilient and sustainable urban forest. Informs tree planting and removal strategies that reduce substantial impacts or catastrophic loss from pests or disease. (e.g., Dutch elm disease, Emerald Ash borer), which is costly for municipalities.
- **Public tree condition.** Benefit: Successful budgeting. Increased public safety. Reduced risk.
- **Management of trees and vegetation in public natural areas.** Benefit: The value of the asset is known and preservation/maintenance is easier to track, resulting in healthier, more resilient natural areas.
- **Tree planting and establishment.** Benefit: Ensure an even urban forest succession, increase tree canopy cover and mitigate effects resulting from tree removal on public and private property. Control costs by proactively replacing tree assets on public property.
- **Native trees/vegetation.** Benefit: Resilient urban forest if climate-adaptable replacement species are considered. Often requires less maintenance, optimizes ecosystem health, and provides pollinator and wildlife habitat.

Based on the Clark model for sustainable urban forest programming, the ability to track and manage tree attributes associated with these criteria ensures efforts are aligned with best practices toward a healthy, resilient urban forest.

## Next Steps

Collecting inventory data on public trees is a major step towards proactive management of an important infrastructure asset. So that public trees function well in their intended landscape, provide optimal benefits to the community, and remain reasonably safe for property and people, this technical memo was developed in anticipation of the City of Lakewood establishing an urban forestry program and acquiring its tree management software. Recognizing how the City is currently managing its public tree assets, combined with recent findings from updated tree inventory data enables the City to consider appropriate tree asset management software and management strategies, enabling a shift from a reactive to more proactive public tree management approach.

Ideally, the software system will support and not dictate a user's management objectives and activities. The work session outcomes herein help to understand what types of questions the inventory needs to answer. Yet, as development of the urban forest program progresses, additional information will be needed on:

- Who will be responsible for managing the system?
- Is the tree inventory software under consideration compatible with StreetSaver, Lakewood 311, or other existing platforms?
- How much training time is required by the software, compared to staffing capacity?
- What kind of upgrades and technical support does the software company offer?

Facet recommends that the City consider the features and costs of various municipal tree inventory software platforms (Attachment A) to answer these and additional questions and considerations that the software users may have. Facet can also facilitate the scheduling of software demonstrations to assist in the decision-making process.

If you have any questions, please contact us at your convenience.

## References

Clark, J., Metheny, N., Cross, G., Wake, V. 1997. A Model of Urban Forest Sustainability. *Journal of Arboriculture* 23(1): January 1997.

Attachments:

**ATTACHMENT A.** Work Session Questions

## Tree Management Software Programs

The purpose of this list is to introduce software options for City review, prior to engaging with vendors. The list comprises software options for municipal tree management, with features that integrate into other municipal platforms. Because features and options vary widely across tree management software platforms and costs are regularly updated, only contact information and general notes are provided below.

Table 1. Tree Management Software.

Tree Inventory Software/App	Developed by	Notes
My City's Trees <a href="https://mct.tfs.tamu.edu/app">https://mct.tfs.tamu.edu/app</a>	US Forest Service, Texas A&M Univ., and i-Tree	Open source. Launched in Chicago, available for 9+ cities in the US. Web-based
Tree Plotter <a href="https://planitgeo.com/treeplotter/">https://planitgeo.com/treeplotter/</a>	PlanIT Geo	Web/cloud-based GIS tree inventory platform optimized for live access using mobile devices.
OpenTreeMap <a href="https://opentreemap.github.io/">https://opentreemap.github.io/</a>	Azavea	Open source or subscription inventory-ecosystem services calculation tool. Used by cities such as Philadelphia, San Francisco, and Grand Rapids.
TreeKeeper <a href="https://www.davey.com/environmental-consulting-services/treekeeper-inventory-management-software/">https://www.davey.com/environmental-consulting-services/treekeeper-inventory-management-software/</a>	Davey Resource Group	Web/cloud-based GIS tree inventory platform optimized for live access using mobile devices. Extensive features and ability for custom functions and strong customer support. Drawbacks include cost and may have a steep learning curve for new users.

Tree Inventory Software/App	Developed by	Notes
Tree Works <a href="https://www.kenersongroup.com/Home/TreeworksOnline">https://www.kenersongroup.com/Home/TreeworksOnline</a>	Kenerson Group (Community Forests Consultants, Jim Flott) <a href="https://www.asca-consultants.org/members/?id=38116022">https://www.asca-consultants.org/members/?id=38116022</a>	Online ESRI GIS-based platform. Collect data with traditional Windows-based devices with ArcPad or edit inventory with live access using mobile devices.
Arbor Pro <a href="https://arborprousa.com/arborpro-software/">https://arborprousa.com/arborpro-software/</a>	ArborPro Management Software	Web/cloud-based GIS tree inventory platform optimized for live access using mobile devices.
Ecoteka <a href="https://www.natural-solutions.world/ecoteka">https://www.natural-solutions.world/ecoteka</a>	Natural Solutions, Inc.	Open-source platform (free to use and customize) with mobile device accessibility, easy to use. Tracks tree condition and maintenance activity. Drawbacks include limited advanced features and basic mapping capabilities.
<b>Urban Forest Ecosystem Service Benefits Software</b>		
iTree Streets <a href="https://www.itreetools.org/tools/i-tree-streets">https://www.itreetools.org/tools/i-tree-streets</a>	Davey/USFS (previously Stratum)	Assess street tree benefits using existing inventory data. Can collect data on mobile device
iTree Eco <a href="https://www.itreetools.org/tools/i-tree-eco-mobile-data-collection-mdc">https://www.itreetools.org/tools/i-tree-eco-mobile-data-collection-mdc</a>	Davey/USFS (previously UFORE)	See above. Calculates ecosystem service benefits, can collect inventory data.
BenMAP <a href="https://www.epa.gov/benmap">https://www.epa.gov/benmap</a>	EPA, integrated into iTree ECO	Uses GIS data to estimate economic and health implications of urban forests based on air quality.

# ATTACHMENT A. Work Session Questions

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## City of Lakewood

### Tree Management Software Consultation

Tree inventory asset management helps municipalities keep track of routine tree maintenance and can be used for both short- and long-term urban forest planning and management processes. There are several software programs specifically designed to manage tree inventory data, track ongoing tree health, planting activities, and maintenance needs, and provide day-to-day work orders (See Table 1 on page 4 for a list of tree management software programs). Some jurisdictions integrate their tree inventory data directly into their public works asset management software (e.g. CityWorks) where each tree is treated and tracked as an asset, much like a fire hydrant or street segment.

The following questions are intended to solicit information to better understand the City's current and anticipated tree management tracking needs, staffing, and existing asset management system. After the work session, Facet will draft a summary memo with additional information and recommendations based on city staff feedback.

#### Why and which tree assets are you managing?

1. How will you be using your tree data? Typically, inventories are used to
  - a. Proactively manage assets, versus responding to the highest priorities ("putting out fires")
  - b. Manage assets with specific objectives for species diversity, age distribution, etc.
  - c. Ensure equitable distribution of tree care services
  - d. Prevent catastrophic loss due to pests/disease infestation, abundance of poor condition/senescent/hazard trees, etc.
  - e. Quantify ecosystem services or other benefits
  - f. Give the public a better understanding of the urban forest, certain tree populations or specific trees (e.g. Heritage Trees)
  - g. Identify new tree planting areas, etc.
2. Which trees are you looking to manage?
  - a. ROW (arterials/collectors, side streets, unopened/unmaintained ROW)
  - b. Parks (formal landscaped or managed areas)
  - c. Green belt/open space/forested areas
  - d. Individual trees that meet certain criteria ("notable")?
3. Which tree attributes (species, DBH, condition, etc.) need to be collected or updated regularly to achieve your primary objectives?
4. Does inventory software need to categorize:

- a. Management actions
  - b. Priority levels, ie high, medium, and low for scheduling work by area or ROW corridors
  - c. Management cycles for different intensities or pruning objectives (e.g., establishment/young tree structural pruning years 1-4, sight-line and clearance pruning years 5-10+, mature tree pruning years 6-7+ on a rotational basis thereafter. As needed for emergencies, accidents, inclement weather, etc. tree removal, or urgent pruning needs.
5. Who is the audience for inventory data findings/results and mapping?
- a. Decision-makers for budgeting and policy purposes
  - b. Public education/outreach

### **Staffing**

6. Who is collecting and updating tree inventory data?
- a. City arborist/urban forester
  - b. Public works staff
  - c. Parks staff,
  - d. Consultants
  - e. Volunteers
7. After the data is collected, will manage the data? [Consider the steps/frequency of inventory updates for tree removals, plantings, inspections, or other actions that change DBH or condition attributes and if those inventory updates could occur in the field.]
- a. City arborist/urban forester
  - b. Maintenance staff
  - c. GIS staff
  - d. Other

### **Funding/Budget Considerations**

8. What is the City's budget and resources available for Tree Asset Management Software?

### **Current Asset Management Program**

9. What MMS (maintenance management system) is your Public Works or Parks department using now for managing grey infrastructure assets such as sidewalks, sewer/stormwater? Examples: Hansen, etc.
10. Is the system a web-based, cloud-based app? Does it have the capability to adapt its attributes, run queries, or be compatible with other inventory software? Static vs. dynamic asset management.
11. What permit database software is your City using now? Energov, Advantage, TraKit/ComDev, etc.
12. Are your MMS assets mapped in GIS so data can be shared by other departments? Viewed online?